



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Development of Airport Obstruction Identification System		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Ed Kondrath		
TASK ORDER NUMBER: 115 / 4-26857	PRINCIPAL INVESTIGATOR: Patrick Szary		
Project Starting Date: : 01/1/2002 Original Project Ending Date: 12/31/2003 Modified Completion Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1. Literature Search	10%	0%	100%	10%
2. Develop criteria	5%	0%	100%	5%
3. Evaluate the cost effectiveness	8%	0%	100%	8%
4. Conduct laboratory experiments	5%	0%	90%	4.5%
5. Conduct laboratory/field experiments	15%	0%	93%	14%
6. Develop prototype software	25%	0%	80%	20%
7. Demonstrate field test system	5%	0%	90%	4.5%
8. Redesign a new prototype	5%	0%	100%	5%
9. Demonstrate prototype system	5%	0%	80%	4%
10. Train NJDOT personnel	7%	0%	75%	5.25%
11. Final Report	10%	0%	50%	5%
TOTAL	100%			85.25%

Project Objectives:

The objective of this research is to develop a prototype system for easily acquiring data either at fixed intervals or over time and generate a tree removal/trimming plan for discretized trees/tree areas. The areas could be identified using Global Position technology or produced using purchased aerial satellite photographs of the surrounding airport space.

Project Abstract:

The Division of Aeronautics is statutorily obligated to identify all obstructions to the approaches at the State's public use airports and heliports; and to have these obstructions removed. The first line of trees may be shadowing other obstructions that are not visible until the first line of trees is removed. Since tree removal/trimming often impacts surrounding landowners, multiple cuts or frequent removals are not desirable and in some jurisdictions are not feasible. The goal of this research is to provide the state with a device or methodology to identify a tree removal/trimming strategy for an annual cut where the trees surrounding the airport will remain within regulations.

1. Progress this quarter by task:

- A. All work was delayed this quarter due to lack of personnel or qualified consultants. It is anticipated that the upcoming quarter we will be able to restart the work and move the project towards completion.

2. Proposed activities for next quarter by task:

- A. All tasks identified last quarter:
 - a. The completion of the integration of the Bergen Industrial Twin and outfitting the unit with all the necessary components for testing.
 - b. A beacon antenna and support equipment needs to be purchased for the gps unit so that we can acquire the quoted accuracy of about 80 cm in 20 seconds. The gps unit must be tested

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and its functionality confirmed. The gps antennae require a clear view of the sky which leaves mounting of the antennae a challenge. Side structures that will allow mounting of the gps antenna outside the shadow of the main blades need to be fabricated and mounted to the helicopter undercarriage. It is not certain at this point how long these side trusses need to be but we will start by mounting the antennae out as far as the blade's span. The gps unit needs to be mounted in a metal enclosure to shield it from the electromagnetic interference generated by the ignition coils of the engine and metal to metal contact of the helicopter drive train.

- c. Once the gps and antennae can be mounted, tests of the gps's ability to record a signal with the helicopter running need to be done. We need to verify that the gps can record the helicopter's position in a short enough amount of time that the helicopter hasn't drifted substantially within the time after an image is taken. If the current setup can provide such functioning then we will test fly the helicopter and start taking aerial pictures. Then we can start providing images and coordinates to the software engineers so that they can verify whether the 3-D maps generated correspond to actual dimensions of the location.
 - d. Test flying the helicopter at the chosen airport and sending acquired images to Oakland University for post processing and producing a detailed map.
- B. If one of the various alternatives is selected, it might be possible to do a rapid integration in the beginning of 2006. We have already discussed several options.
 - C. Continuation of work on the final report.

3. List of deliverables provided in this quarter by task (product date):
n/a

4. Progress on Implementation and Training Activities:



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5. Problems/Proposed Solutions:

- This research study has proven to be challenging. The proposed solution utilizing R/C Helicopters for Low Altitude Mapping has been shown to be a viable solution in concept. However, user acceptance as well as technology limits has been a difficult challenge to overcome. NJDOT Aeronautics has been very cooperative and has made numerous suggestions to improve the study. For example, even once the unit is assembled and ready to fly slight roles and drifts can create substantial errors, in an ideal situation with expert flyers these effects can be minimized but still are not 'negligible'. Also, small GPS technology still has significant variance....since this study began several newer generations of GPS have become commercially available; the very nature of the technology is dynamic, not to mention expensive. At this time there is still merit to the project and we are committed to delivering the NJDOT a usable product. We believe the project should be extended, the current end date is 12/31/05 however, we have requested an extension.

Total Project Budget	\$210,000.00
Modified Contract Amount:	
Total Project Expenditure to date	\$113,531
% of Total Project Budget Expended	54%

These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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QUARTERLY PROGRESS REPORT

Project Title:	Transportation Safety Professional Development Clearinghouse		
RFP NUMBER: Not Available	NJDOT/FHWA RESEARCH PROJECT MANAGER(S): Pat Ott		
TASK ORDER NUMBER/Study Number: Task Order No. 144/ 4-29063	PRINCIPAL INVESTIGATOR: Ali Maher/Joe Orth/Claudia Knezek		
Project Starting Date: 8/5/2003 Original Project Ending Date: 12/31/2005 Modified Completion Date: 12/31/2006	Period Covered: 3rd Quarter 2006		

YEAR 2004-2005

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1.0 Literature Search				
1.1 Conduct literature search	20		100	20
1.2 Prepare Lit Review for NJDOT & FHWA	5	10	85	4.25
2.0 Business Requirements				
2.1 Gather information from users	20	40	100	20
2.2 Prepare Business Requirements Document	5	20	70	3.5
3.0 Create Web Based System				
3.1 Construct Web Site	4		50	2
3.2 Construct Data Bases	10	10	60	6
3.3 Develop Online Resources and Career Resource Center	5	10	85	4.25
3.3 Code/Debug/Test	15		50	7.5
4.0 Training	8		50	4
5.0 Delivery & Support	8		50	4
TOTAL	100			75.5%

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YEAR 2006

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1.0 Literature Search				
1.1 Conduct literature search	20	5	100	20
1.2 Prepare Lit Review for NJDOT & FHWA	5	5	100	5
2.0 Business Requirements				
2.1 Gather information from users	20	10	100	20
2.2 Prepare Business Requirements Document	5	10	100	5
3.0 Create Web Based System				
3.1 Construct Web Site	4	10	95	3.8
3.2 Construct Data Bases	10	5	90	9
3.3 Develop Online Resources and Career Resource Center	5	5	95	4.75
3.3 Code/Debug/Test	15	0	75	11.25
4.0 Training	8	0	0	
5.0 Delivery & Support	8	0	0	
TOTAL	100			78.8 %

Project Objectives: The goal of the Transportation Safety Professional Development Clearinghouse is to develop a pilot project that will provide assessment tools and online capabilities to promote and track continuing education activities for transportation safety professionals throughout New Jersey.

Project Abstract: Nationwide, the transportation community is facing a potential workforce crisis by the year 2010 because of the anticipated retirement and early retirement of the generation known as the “baby boomers”. This potential loss of experience and expertise, along with advances in technology and an increased emphasis on safety and national security, has prompted Federal and State transportation agencies to focus on employee development as one of their strategic goals.

The CAIT-LTAP staff will work with managers and staff members of the transportation community to provide strategies for organizing professional development opportunities for transportation personnel. They will research training formats currently available to adult learners and evaluate the major delivery systems, including distance learning and traditional programs available through FHWA and other transportation agencies, to determine acceptability for training purposes. CAIT-LTAP will assist managers in conducting assessments of employees in order to determine the appropriate individual career development plan that is needed to fulfill professional goals. CAIT-LTAP will make recommendations regarding training opportunities that are available to staff members and will create an online data base accessible to each employee, incorporating appropriate security to maintain confidentiality. Assessments and individual development plans will be reviewed to determine a widespread need for a specific workshop, which would then be scheduled at Rutgers University. For limited training needs, the Rutgers staff will refer users to appropriate agencies that sponsor the needed training as well as neighboring colleges offering graduate and undergraduate courses.

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This project will provide transportation facilitators, providers, and users with an online resource to archive and track continuing education in New Jersey. Specifically, it will allow NJDOT to track participants that are required to take safety training in New Jersey.

Progress this quarter by task:

- 1.2 Lit Review updated to reflect current trends and updates on Workforce Crisis. Contributed articles on Professional Development to CAIT-LTAP newsletter.
- 2.1 Obtained core requirements for job titles associated with key safety professions.
- 2.2 Updated Business Requirements for data base developer.
- 3.1 Selected vendor from 4 responses to RFP to complete work on web site.
- 3.2 Began construction of actual data base. Modified spreadsheets for classes, workshops, on-line courses, CD ROM & video instruction in preparation for loading into the data base. Number of modifications exceeded 200 this quarter.
- 3.3 Multiple meetings with vendor to assure usability of system.

Proposed activities for next quarter by task:

- 1.1 Continue to search for appropriate classes to add to the database.
- 2.2 Demo system capabilities and further define web site requirements based on feedback from demo.
- 3.2 Update course spreadsheets/database with additional information.
- 3.3 Complete and Test web site.
- 4.0 Provide training to initial users.
- 5.0 Deliver system.

List of deliverables provided in this quarter by task (product date):

- 1.2 Updated Lit Review (Sept 2006).
Contributed articles on Professional Development to CAIT-LTAP Newsletter (July/Aug/Sept 2006).
- 2.2 Updated Business Requirements Document (August 2006).
- 3.2 Updated spreadsheets of available training (Sept 2006).

Progress on Implementation and Training Activities:

No training has occurred this quarter.

Problems/Proposed Solutions:

Project did not proceed as quickly as expected due to the unexpected need to circulate an RFP to select a vendor to complete the web site. The selected vendor has the background necessary and is expected to complete the task during the next quarter.

Total Project Budget	\$545,635
Modified Contract Amount	\$545,635
Total Project Expenditure to date	\$498,883
% of Total Project Budget Expended	91%

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QUARTERLY PROGRESS REPORT

Project Title:	Transportation Management System Data Validation and Data Quality Assessment		
RFP NUMBER:			NJDOT RESEARCH PROJECT MANAGER: Gary Zayas
TASK ORDER NUMBER: TO 176 / RU Acct 4-26598	PRINCIPAL INVESTIGATOR: Dr. Ali Maher/Dr. Mohsen Jafari		
Project Starting Date: 11/1/2005 Original Project Ending Date: 5/1/2006 Modified Completion Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Team Formation	12.44%	\$ 30,000.00	30.0%	\$ 9,000	100.0%	\$ 30,000
2	Safety Mgmt System	9.12%	\$ 22,000.00	88.0%	\$ 19,360	100.0%	\$ 22,000
3	Drainage Mgmt System	9.12%	\$ 22,000.00	25.0%	\$ 5,500	30.0%	\$ 6,600
4	Pavement Mgmt System	9.12%	\$ 22,000.00	35.0%	\$ 7,700	40.0%	\$ 8,800
5	Bridge Mgmt System	12.44%	\$ 30,000.00	35.0%	\$ 10,500	40.0%	\$ 12,000
6	Traffic Mgmt System	9.12%	\$ 22,000.00	5.0%	\$ 1,100	5.0%	\$ 1,100
7	Congestion Mgmt System	9.12%	\$ 22,000.00	35.0%	\$ 7,700	40.0%	\$ 8,800
8	Highway Maintenance Mgmt System	12.44%	\$ 30,000.00	5.0%	\$ 1,500	5.0%	\$ 1,500
9	SLD Mgmt System	12.44%	\$ 30,000.00	5.0%	\$ 1,500	5.0%	\$ 1,500
10	Final Reporting	4.64%	\$ 11,200.00	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 241,200		\$ 63,860		\$ 92,300

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Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

This is an academic-industry collaborative project aiming at providing an independent and quantitative assessment of the data validity, quality, and integrity for the existing eight NJDOT Transportation Management Systems.

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Project Abstract:

Presently NJDOT utilizes eight Transportation Management Systems consisting of the following databases: Safety Management System, Traffic Management System, Drainage Management System, Pavement Management System, Congestion Management System, Highway Maintenance Management System, Bridge Management System, and Straight Line Diagram

These systems range in complexity from a single spreadsheet to comprehensive client-server multi-unit databases on enterprise-level hardware to applications on mainframes. These systems have been developed independently and do not utilize any data sharing schemes. At the same time the data maintained in these systems are collected using various methodologies and from various sources ranging from laboratory analysis, computer analysis, law enforcement to field collection. The data maintained in these databases provide decision making support for the various DOT management and planning functions. Therefore, it is imperative to ensure that data are collected, maintained and utilized properly.

1. Progress this quarter by task:

- Interviewed 5 of the 8 NJDOT Management Systems' engineers and staff
- Summarize interviews and findings for 5 Management Systems
- Receive and review existing NJDOT planning and engineering documents/system specifications/SOPs and Quality documents for 5 of the 8 systems.
- Develop qualitative and quantitative test plans for data validity, data quality and data integrity for 4 of the 8 Management systems.
- Submitted test plans to technical and advisory committees which were approved.
- Tested safety data.
- Made recommendations for Safety Management System.
- Turned in final report for Safety Management System.

2. Proposed activities for next quarter by task:

- Finish interviewing the remaining 3 management systems: Traffic, SLD and Maintenance.
- Acquire testing data for the remaining 7 Management systems.
- Develop testing methodology for Drainage, Traffic, SLD and Highway Maintenance Management Systems.
- Submit test plans to advisory committees.
- Conduct testing on remaining 7 management systems.
- Make recommendations on remaining 7 management systems
- Turn in final reports for the remaining 7 management systems.

3. List of deliverables provided in this quarter by task (product date):

- [Safety Management System Final Report \(August 8, 2006\)](#)

4. Progress on Implementation and Training Activities:

5. Problems/Proposed Solutions:



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Total Project Budget	241,200
Modified Contract Amount:	
Total Project Expenditure to date	92,300
% of Total Project Budget Expended	38.3%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Technology Transfer @ CAIT 2006		
RFP NUMBER: 200X-XXX	NJDOT RESEARCH PROJECT MANAGER: Lad Szalaj		
TASK ORDER NUMBER: TO 182 / RU 4-26634	PRINCIPAL INVESTIGATOR Ali Maher/Patrick Szary		
Project Starting Date: 1/1/2006 Original Project Ending Date: 12/31/2006 Modified Completion Date:	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Meetings	2.6%	\$ 1,300	100.0%	\$ 1,300	100.0%	\$ 1,300
2	Quarterly Reporting	9.3%	\$ 4,650	25.0%	\$ 1,163	75.0%	\$ 3,488
3	Fellowships	25.0%	\$ 12,500	0.0%	\$ -	100.0%	\$ 12,500
4	Internships	8.0%	\$ 4,000	0.0%	\$ -	100.0%	\$ 4,000
5	Student of the Year	1.5%	\$ 750	0.0%	\$ -	0.0%	\$ -
6	Research Supervision	53.6%	\$ 26,800	25.0%	\$ 6,700	75.0%	\$ 20,100
7		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
TOTAL		100.0%	\$ 50,000		\$ 9,163		\$ 41,388

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Project Objectives:

Recipients of UTC grants are encouraged to be innovative and creative as they develop their vision for the proposed Center. The planned activities include offering advanced degree programs, professional workshops, and serving as sponsor of a service network for members of the *TIS* community. The guiding vision must identify a component to build a self-sustaining network and establish new directions for research and education for the *TIS* community. An effective strategic plan, inclusive of timelines, identified outcomes, and deliverable products, is critical for the operational success of the newly established organization.



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Project Abstract:

The theme of the Center for Advanced Infrastructure and Transportation (CAIT), is to be a catalyst for creating a multi-modal transportation infrastructure research and education paradigm that incorporates input from members of the *TIS* community. The Center will be active in *TIS* education, research, and technology transfer in the critical areas of safety, mobility, economic growth, human and natural environment, and national security; (envisioned by USDOT in the recently published USDOT Research and Development Plan.) The unique feature of the Center will be its focus on implementation of advanced and cutting-edge technologies, from broad and interdisciplinary sources, used for efficient maintenance and operation of multi-modal transportation infrastructure systems in high volume and heavily utilized intermodal corridors.

The *TIS* maintenance and operation theme will guide all educational, research, and technology transfer activities of the Center. The main criteria for success will be the implementation of goals and objectives that have been identified and will be presented in detail in the following sections of this plan.

1. Progress this quarter by task:

- First, second, and third center set of quarterly reports have been completed and submitted to NJDOT.
- Ongoing research supervision.
- fellowship, and internship information (crosses 2nd and 3rd quarter). The Fellowship was awarded to Layla Issa (selection process followed the strategic plan). The Internships were awarded to Lam Wai Wah and Ericson Christopher (selection process follow the strategic plan)
- Pat Szary attended the directors meeting June 21-24, the meeting covered many topics including improved report, performance measures, strategic plans, research, best practices, tech transfer, and educational initiatives.

2. Proposed activities for next quarter by task:

- 4th quarter reports
- Ongoing research supervision.

3. List of deliverables provided in this quarter by task (product date):

- 3rd quarter reports

4. Progress on Implementation and Training Activities:

insert text here

5. Problems/Proposed Solutions:

insert text here

Total Project Budget	50,000
Modified Contract Amount:	
Total Project Expenditure to date	41,338
% of Total Project Budget Expended	82.6%



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NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Stormwater Management Rule Implementation Process		
RFP NUMBER: 2004-022	NJDOT RESEARCH PROJECT MANAGER: Lad Szalaj		
TASK ORDER NUMBER: TO 162 / RU Acct 4-29305	PRINCIPAL INVESTIGATOR: Qizhong (George) Guo		
Project Starting Date: 01/01/2005 Original Project Ending Date: 12/31/2005 Modified Completion Date: 09/30/2006	Period Covered: 3rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Task Mobilization	8.54%	\$21,000	0%	\$ -	100%	\$ 21,000
2	Task 1 Lit search/ project work plan	6.07%	\$14,923	0%	\$ -	100%	\$ 14,923
3	Task 2 Tech mem; Kick off mtg.	4.96%	\$12,210	0%	\$ -	100%	\$ 12,210
4	Task 3 tech mem doc concerns	4.72%	\$11,610	0%	\$ -	100%	\$ 11,610
5	Task 4 SW BMP table	6.43%	\$15,810	25%	\$ 3,953	100%	\$ 15,810
6	Task 5 Reg Break down	7.04%	\$17,310	25%	\$ 4,328	100%	\$ 17,310
7	Task 6 Tech mem/case studies	8.74%	\$21,510	25%	\$ 5,378	100%	\$ 21,510
8	Task 7 SW decision matrix SWD	9.98%	\$24,560	65%	\$ 15,964	90%	\$ 22,104
9	Task 8 Tech Mem draft SWED for DOT	8.23%	\$20,260	50%	\$ 10,130	50%	\$ 10,130
10	Task 9 Working version of SWED/ manuals	12.16%	\$29,910	25%	\$ 7,478	25%	\$ 7,478
11	Task 10 Presentation	8.01%	\$19,710	25%	\$ 4,928	25%	\$ 4,928
12	Task 11 Final Report	8.84%	\$21,760	40%	\$ 8,704	40%	\$ 8,704
13	Task 12 Training	6.28%	\$15,460	0%	\$ -	0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 246,033		\$ 60,861		\$ 167,716

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Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

The objectives of this study are to:

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Develop an electronic decision process to assist planners, designers and maintenance staff to

- Determine applicable stormwater rules.
- Identify the appropriate treatment train of non-structural and structural stormwater strategies and measures including manufactured treatment devices to comply with the Stormwater Rules

Consider treatment capacity, footprint (Right of Way requirements), cost, frequency of maintenance and operating cost.

Project Abstract:

The NJDEP implemented the Stormwater Management Rules N.J.A.C. 7:8 in February 2004 in order to protect the waters of the State from adverse impacts of stormwater runoff. The regulations require projects that disturb one or more acres of land or create at least 0.25 acres of impervious surface to comply with stringent stormwater management standards. These regulations are general in nature, confusing, at times appear to be contradictory, and are difficult to implement within a transportation project. The Stormwater Best Management Practices (BMP) Manual developed by the NJDEP provides examples of techniques and various methods to meet the standards, however it requires the designer to be aware of all the applicable NJDEP regulations and select the appropriate stormwater management technique.

1. Progress this quarter by task:

Task 4 was completed and a report forwarded to NJDOT. Task 5 and 6 were completed as part of Task 7. Task 7 is 90% completed with a version ready for testing by September 11. At that time a demonstration will be given to Lad Szalaj and David Ahodout for initial comments prior to presenting to the whole task force. Documentation in Task 8 is essentially half done and will be completed once Task 7 is demonstrated. The working version manuals have just begun and wait the final version. The final report for Task 11 is 40% completed and will be finalized once the version the electronic version is tested. Training will commence upon approval of the product.

2. Proposed activities for next quarter by task:

A two-month extension will be requested to finalize the product being produced.

3. List of deliverables provided in this quarter by task (product date):

The Task 4 report was submitted.

4. Progress on Implementation and Training Activities:

Training activities are due at the end of the project.

5. Problems/Proposed Solutions:

The problems areas were in finalizing the process and now seem to well in hand.

Total Project Budget	\$246,033
Modified Contract Amount:	
Total Project Expenditure to date	\$167,716
% of Total Project Budget Expended	68%

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NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	8 th Annual NJDOT Research Showcase		
RFP NUMBER: 2006-XXX	NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj		
TASK ORDER NUMBER: TO 187 / RU Acct 4-	PRINCIPAL INVESTIGATOR: Dr. Ali Maher		
Project Starting Date: 01/01/2006 Original Project Ending Date: 12/31/2006 Modified Completion Date:	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
2	Secure Facility (space rental and catering for 200)	38.7%	\$ 9,677	0.0%	\$ -	20.0%	\$ 1,935
3	Pre-Event Coordination	30.2%	\$ 7,550	75.0%	\$ 5,663	85.0%	\$ 6,418
4	Pre-Event Provisions	7.0%	\$ 1,750	50.0%	\$ 875	50.0%	\$ 875
5	On-Site Facilitation	20.2%	\$ 5,050	0.0%	\$ -	0.0%	\$ -
6	Post Event Follow-up	1.9%	\$ 472	0.0%	\$ -	0.0%	\$ -
7	Final Report and Quarterly Reporting	2.0%	\$ 500	25.0%	\$ 125	50.0%	\$ 250
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 24,999		\$ 6,663		\$ 9,478

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Green text is updated ever quarter

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Project Objectives:

1. To enhance the NJDOT's technology transfer capabilities and research problem identification to promote what research can do for NJDOT's departments and bureaus to solve current and future problems, as well as to encourage research problem statements.
2. To provide a forum for transportation related agencies to foster a partnership between NJDOT, academia, transportation professionals, and private industry for the purpose of shared knowledge in the advancements being made in the field of transportation research and technology.
3. To showcase NJDOT research and technology initiatives.

Project Abstract:

The goal of the Eighth Annual NJDOT Research Showcase is to familiarize NJDOT customers with the broad scope of ongoing research initiatives, technology transfer activities and academic research potential represented by our university research partners and their associates. The intended purpose of this event is to provide more academic partnership opportunities between NJDOT and the universities.

1. Progress this quarter by task:

A draft of the event brochure was submitted for review on July 27, 2006. Comments were received on July 28, 2006. A return copy of the brochure was submitted on August 15, 2006.

The start time was changed from 7:30 to 8:30 am to allow for travel from northern locations.

The afternoon breakout sessions were reduced from four to three based on comments from Angelo Mendola.

The event website was activated on August 14, 2006.

Presentation topics were received throughout July and August.

Brochures were printed and distributed to NJDOT.

Presentation abstracts, powerpoints, speaker biographies and student award nominations were solicited and tracked.

Catering selections have been ordered, with final count do in late October.

Event provisions (pens) have been ordered.



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2. Proposed activities for next quarter by task:	Estimated Product Date:
- Online and mail-in registrations	through October 16, 2006
- Request and tracking of presentations	through October 16, 2006
- Receipt of presentations and speaker biographies	October 16, 2006
- Receipt of student award nominations	October 16, 2006
- Preparation of event program	October 16-20, 2006
- Printing of event program	October 20, 2006
- Preparation of certificates and plaques	October 20, 2006
- Preparation of nametags	October 23-25, 2006
- On site registration and facilitation	October 27, 2006
- Invoice processing	October 30, 2006
- Thank you notes	November 6, 2006
- Third quarter report	December 30, 2006

3. List of deliverables provided in this quarter by task:	Product date:
Draft of brochure	July 27, 2006
Webpage	August 14, 2006
Updated brochure	August 15, 2006
Receipt of speaker names/presentation topics	September 1, 2006
Request to Deans/Dept. Chairs for opening remarks	September 1, 2006
Request to schools for student award nominations	September 1, 2006
Brochures printed	September 1, 2006
Pens ordered	September 8, 2006
Catering order	September 29, 2006
Quarterly report	September 30, 2006

4. Progress on Implementation and Training Activities:

5. Problems/Proposed Solutions:

Total Project Budget	\$24,999.00
Modified Contract Amount:	
Total Project Expenditure to date	\$9,478.00
% of Total Project Budget Expended	38%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Flexible Overlays for Rigid Pavements		
RFP NUMBER: 200X-XXX	NJDOT RESEARCH PROJECT MANAGER: NJDOT Project Manager		
TASK ORDER NUMBER: TO 184 / RU Acct 4-26554	PRINCIPAL INVESTIGATOR(S): Dr. Ali Maher/Mr. Thomas Bennert		
Project Starting Date: 1/1/2006 Original Project Ending Date: 12/31/2007 Modified Completion Date:	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	6.8%	\$ 45,000.00	0.0%	\$ -	100.0%	\$ 45,000
2	Literature Search	2.7%	\$ 17,500.00	10.0%	\$ 1,750	100.0%	\$ 17,500
3	3-D FEM Modeling	37.5%	\$ 250,412.00	15.0%	\$ 37,562	30.0%	\$ 75,124
4	HMA Mixture Design for HMA Overlay Materials	26.9%	\$ 179,588.00	15.0%	\$ 26,938	40.0%	\$ 71,835
5	Laboratory Test Simulation to Match Model Prediction	15.9%	\$ 105,850.00	10.0%	\$ 10,585	20.0%	\$ 21,170
6	Development of Draft HMA Mixture Specifications	3.1%	\$ 20,066.00	25.0%	\$ 5,017	40.0%	\$ 8,026
7	Development of "Decision Tree" Protocol for the Design of Flexible Overlays on Rigid Pavements	3.0%	\$ 19,577.00	0.0%	\$ -	10.0%	\$ 1,958
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20	Final Report and Quarterly Reporting	4.1%	\$ 30,689.00	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 668,682		\$ 81,852		\$ 240,613

Blue text is entered once at the beginning of the project

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Black text is automatically updated or static

Project Objectives:

The objective of the research project is to develop guidelines for the NJDOT to properly select flexible pavement "systems" that can provide sufficient pavement life when used on rigid pavements (PCC).



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Project Abstract:

Although reflective cracks significantly shorten the pavement service life, there is a lack of a performance-based HMA mixture design specification for routine use to develop HMA mixtures for use as flexible overlays for rigid pavements. Furthermore, neither the NCHRP 1-37A (Mechanistic-Empirical Pavement Design Guide) nor NCHRP 9-17 (Superpave Support and Models Management) specially address laboratory tests or mixture design procedures for the evaluation of reflective cracking, although the recently initiated NCHRP 1-41 (Models for Predicting Reflective Cracking of Hot Mix Asphalt Overlays) led by the Texas Transportation Institute (TTI) will try to provide guidance on these issues. Therefore, there is an urgent need to develop a performance-based HMA mixture design specification for different HMA mixtures for New Jersey, as well as evaluate and characterize new HMA mixtures and additives, to aid in resisting/prolonging the on-set of reflective cracking.

The research study will utilize information from literature searches, surveys, finite element modeling, and extensive field and laboratory testing to develop guidelines for use in the HMA overlay design of composite/PCC pavements. A “Decision Tree” system, that will utilize field forensic testing, as built information, and traffic, will also be developed, which will aid the NJDOT is designing longer life HMA overlays for rigid pavements.

1. Progress this quarter by task:

1a. Survey Results

A technical memorandum was developed based on the state agency replies to the reflective cracking survey. This will be submitted to the NJDOT and participants at the Quarterly Meeting.

1b. Field Forensic Testing of Test Site #1 – Route 34N

The initial traffic data supplied by AID was unfortunately incorrect. A modified version was resubmitted by AID. The traffic data and FWD data were analyzed and used to develop “typical” deflections at the joint that will be used as a performance criteria in the flexural beam fatigue device, as well as an input and quality check in the 3-D FEM model.

Also, PCC cores that were collected from RT 34N were tested in the new Coefficient of Thermal Expansion unit. These results will be used to develop a performance criteria in the Overlay Tester, as well as an input into the 3-D FEM modeling.

AID is currently organizing the data and it is hopeful that it will be presented at the quarterly meeting.

1c. Development and Validation of a Rich Bottom Layer (RBL) Spec

Laboratory work began at validating the RBL spec previously developed. Mt. Hope aggregate source was used to develop HMA mix designs for aggregate gradations that were at the coarse, middle, and fine end of the gradation band. Performance testing will be conducted on the different mixes at



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optimum, -0.3% and +0.3% of optimum asphalt content. A PG64-22 and PG70-28 will be used, as well as a crumb rubber modified asphalt binder.

1d. Laboratory Testing of Rt 34N Strata and 12.5mm Mix

Laboratory testing was conducted on the loose mix sampled from the Rt 34N project. Laboratory testing conducted on both the Strata and 12.5mm mix were:

- Asphalt Pavement Analyzer
- Flexural Beam Fatigue
- Overlay Tester

Samples were also constructed with 12.5mm on top of Strata to be tested in the Overlay tester. The thickness of the Strata was varied from 0.5, 0.75, and 1.0 inches to evaluate the influence of the Strata thickness on the number of loading cycles until reflective cracking occurs in the overlaying layer (12.5mm mix).

2. Proposed activities for next quarter by task:

2a. Field Forensic Testing of Test Site #2 – Rt 202

A second test site was selected to evaluate the field performance of flexible overlays, Rt 202 S, MP 13.4 to 17.0. This location currently has a PCC pavement that has yet to be overlaid with HMA. Field testing scheduled to be conducted are:

- Falling Weight Deflectometer (at mid-span and at joints)
- Ground Penetrating Radar
- Dynamic Cone Penetrometer
- Weigh-in-Motion sensor and vehicle classifiers
- Cores of PCC and soil samples

2b. Measuring the Coefficient of Thermal Expansion (CTE) for PCC

To evaluate the influence of environmental loading on the development of reflective cracking, two new tests are being evaluated: 1) Coefficient of Thermal Expansion (CTE) for PCC and 2) Asphalt Overlay Tester.

Although a test system dedicated to measuring the Coefficient of Thermal Expansion (CTE) of PCC is not currently available, the Rutgers Asphalt/Pavement Laboratory has custom built a test system to simultaneously test two (2) PCC samples for CTE. CTE is a parameter that describes a material's tendency to expand and/or contract due to changes in temperature. The Coefficient of Thermal Expansion (CTE) is the main PCC material parameter that controls the change in joint/crack opening of PCC. According to Darter (1977), change in PCC temperature should produce the following change in joint opening:

$$\Delta u = \beta \alpha L \Delta T_{PCC}$$



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where,

- Δu = the change in joint opening;
- ΔT_{PCC} = the change in PCC temperature
- β = the PCC/base friction coefficient
- α = the PCC coefficient of thermal expansion
- L = effective joint spacing

The movement at the joint, Δu , creates an environmental induced tensile stress at the bottom of the HMA overlay. Although not critical during warmer temperatures due to the asphalt's less stiff nature, Δu can, and in most circumstances, initiate reflective cracking during colder months when the asphalt overlay is much stiffer and not able to relax under tensile loading. Therefore, having proper knowledge of the CTE prior to pavement/overlay design may allow the designer to better select construction materials.

Rutgers University is currently working with the Materials Bureau at NJDOT in developing a database of CTE values for various PCC mixes used in transportation-related construction project. A total of 10 different PCC mixes have been identified and sampled for testing. The measured CTE, using the AASHTO TP60 test procedure, will be compared to PCC mix properties to develop a predictive equation for the estimation of CTE to aid in;

- Better selection of joint sealants;
- Better selection of HMA overlays;
- Better selection of materials for PCC design.

The developed database should provide future guidelines on the expected environmentally induced movements in the NJDOT current PCC design.

2c. Continuation of Laboratory Evaluation of Rich Bottom Layer mixes

Rich Bottom Layer (RBL) mixes will continue to be evaluated. Mix design is being completed and the performance testing will soon begin for the first aggregate source (Mt. Hope's granite/gneiss). A second aggregate source from Trap Rock Industries (a trap rock aggregate) will also be used in the study. Three asphalt binder types will be evaluated; PG64-22, PG70-28, and a crumb rubber modified asphalt binder.

3. List of deliverables provided in this quarter by task (product date):

N.A.

4. Progress on Implementation and Training Activities:

N.A.

5. Problems/Proposed Solutions:

N.A.

Total Project Budget	\$668,682
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Modified Contract Amount:	
Total Project Expenditure to date	\$240,613
% of Total Project Budget Expended	36%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	TRANSPORTATION SAFETY RESOURCE CENTER		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Patricia Ott		
TASK ORDER NUMBER: 150 / 4-29142	PRINCIPAL INVESTIGATOR: Dr. Ali Maher		
Project Starting Date: 4/1/2004 Original Project Ending Date: 12/31/2004 Modified Completion Date: 12/31/2006	Period Covered: 3rd Quarter 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1. Startup	30	0	100	30
2. Database Development	30	60	83	25
3. Analysis/Traffic Engineering	30	40	83	25
4. Technology Transfer	10	0	100	10
TOTAL	100%			90%

Project Objectives:

The center will strive to assist NJDOT in their efforts to improve highway safety by creating a new core program that consolidates existing efforts championed by both the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA). The TSRC will provide services to the NJDOT Division of Traffic Engineering and Safety Programs, along with technical support on merging specialized data sources with the New Jersey Crash Records System.

More Specifically the TSRC will partner with the NJDOT to develop and deliver training programs and technical assistance programs to supply the locals with the preliminary analysis of crash data using advanced decision support systems. The TSRC will also provide support to the New Jersey Safety Conscious Planning (SCP) Network that has been established between NJDOT and the Metropolitan Planning Organizations (MPO). Research and Technical support will also be provided to NJDOT with the efforts to establish a comprehensive Safety Management System (SMS) which will integrate existing and yet to be identified databases involving both traditional and non-traditional stakeholders.

The center will be focused on assisting locals with developing safety solutions that meet the "tier one" or quick fix/low cost projects. By using the resources of the center, the local users will package and present their problems to NJDOT along with potential solutions. This will then allow for a much more efficient and objective response from the NJDOT.

Project Abstract:

The Transportation Safety Resource Center is a partnership between federal and state transportation agencies, local stakeholders, academic institutions, and the private sector to provide technical and educational services to address transportation safety in New Jersey.



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1. Progress this quarter by task:

- TSRC staff members have conducted or attended the following:

-

Dates	Program
6/5/2006	CAIT Open House
6/7	Meeting with TSD consultants
6/14	Forum Planning Committee
6/15	NJDOT RFP Pre-proposal meetings
6/20	DVRPC synthesis meeting
6/26	MVC Older Driver Roundtable
6/29	Safety Town
6/30	NJDOT Senior Safety Initiative
7/11	SSIMC meeting
7/12-14	Identification & Treatment of High Hazard Locations
7/18, 20, 24	Safety Impact Team
7/21	Technical Steering Committee
7/26	Meeting with TSD consultants
8/16	Forum Planning Committee

- Traffic safety engineering efforts for the TSRC have continued. This quarter the activities have consisted of:
 - o Continue to collaborate with NJDOT on weekly basis and coordinate efforts of TSRC units.
 - o Participation in Route 1 & 9 Safety Impact Team as part of New Jersey's Safe Corridor Program
 - o Continued to provide input for and testing of the updated statistical software for crash analysis, which includes GIS, that has been developed by the application development team.
 - o Performed crash analysis to update data for use in NJ CSHSP
 - o Participation in regional safety initiatives including Regional Safety Task Force synthesis and Action Plan development meeting
 - o Development of TSRC statement for use in CAIT competition for UTC funds
 - o Attended NJDOT pre-proposal meetings for 2007 RFPs
 - o Planned and organized for delivery of Traffic Signal Design course
 - o Continuation of pilot program pending stakeholder input (MPO and/or others).

The application development team at the TSRC has released version 1.3 of Plan4safety. This release has extended features to filtering data and provides a user friendly environment to search data swiftly. New filtering tools, added to the system are as follow:

- o Continue to Geocode recent crash data (03-05) to be utilized in Plan4safety application.
- o Review pervious and present literatures for prediction of crash frequencies and severities and determine the proposed plan for network screening and ranking the crash sites.
- o Implement the proposed model for crash frequencies and severities on two roadway segments (Rt1 & Rt 46)
- o Develop the Plan4Safety user guide.
- o Address some issues raised by users in last training session.
- o Maintain debugging the application.
- o Develop web interface version of Plan4safety for future release.



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In this quarter, considerable efforts were being made on covering some comments, raised by engineers and users in May training session and quarterly technical steering committee meeting. The user guide (help menu), one of common dilemma noted by users, is being integrated to the application. Selection synchronization between filter builder and GIS selection were been incorporated. Therefore, any selection, made in accident selector toolbar (GIS environment), carries over the rest of activities and vice-a-versa. Also, some options in menu bar are reclassified to accommodate users' needs and expectations.

After immense reviews on existing works on prediction of crash frequency and severity, researchers in TSRC proposed crash index for ranking the crash sites. Crash index is weighting crashes based on frequencies and severities. Crash frequencies will be modeled based on Negative Binomial regression and crash severity is going to be modeled upon Discrete Choice.

On one hand, Negative binomial regression model utilizes the traffic and geometry of roadway as explanatory variables. On the other hand, discrete choice model applies accident factors to predict severity. Therefore, crash index will be predicted by considering geometry, roadway traffic condition, accident factors and types. The proposed model is implemented on two roadway segments, Route 1 and 46, though Intersection implementation is also under way.

2. Proposed activities for next quarter by task:

- Continued delivery of traffic safety engineering assistance to local agencies through pilot program
- Continuation of developing TSRC method for network screening and ranking crashes and hot spot analysis
- Continuation of enhancing the Bureau of Safety Program analysis model for all crash types.
- Continuation of the design and updating system and embrace application with new features to improve application utilization.
- Continuation of developing web version of Plan4Safety

3. List of deliverables provided in this quarter by task (product date):

8/24/2006 – Delivery and installation of Plan4Safety (release 1.3).

4. Progress on Implementation and Training Activities:

Not at implementation.

5. Problems/Proposed Solutions:

Total Project Budget	\$1,538,511
Modified Contract Amount:	
Total Project Expenditure to date	\$1,009,702
% of Total Project Budget Expended	66%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Use of Windows-based PDAs for Paperless Operation of Emergency Management Team		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Stan Worosz; John Gahwyler		
TASK ORDER NUMBER/Study Number: Task Order No. 138/4-29091	PRINCIPAL INVESTIGATOR: Dr. Trefor Williams/Dr. Izzat Bakhadyrov/Joe Orth		
Project Starting Date: 12/15/2003 Original Project Ending Date: 12/15/2004 (pending correction) Modified Completion Date: 8/15/2006	Period Covered: 3 rd Quarter 2006		

YEAR 1 (ESP South)

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1. Technology Review	10		100	10
2. Specifications				
2.01 Business Requirements	10		100	10
2.02 Functional Requirements	5		100	5
2.03 Design Specifications	5		100	5
3. Coding and Development	30	10	100	30
4. Debugging	10	10	100	10
5. On-Field Testing	10	10	100	10
6. Training	10	50	100	10
7. Deployment	10	90	100	10
TOTAL	100%			100%
YEAR 2 (ESP North & South)				
Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1. Technology Review	6.5	5	100	6.5
2. Specifications				
2.01 Business Requirements	6.5	0	100	6.5
2.02 Functional Requirements	5	0	100	5
2.03 Design Specifications	5	0	100	5
3. Coding and Development	21	0	100	21
4. Debugging	6	0	100	6
5. On-Field Testing	6	0	100	6
6. Training	4.5	0	100	4.5
7. Deployment	6	0	100	6
8. Observation & Support	33.5	18	100	33.5
TOTAL	100%			100%

Project Objectives: To research and develop a paperless data collection system for New Jersey Traffic Operations North's Emergency Service Program and provide application software to transfer field collected incident data to the central database of New Jersey DOT Operations. To modify the existing system for ESP South to incorporate any new features provided to ESP North, making both systems identical.



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Project Abstract: The New Jersey Department of Transportation (NJDOT) Operations has an immediate need for efficient paperless case data entry solutions for their Emergency Service Providers (ESP's) personnel. The ESP personnel patrol designated areas throughout the State for the purpose of performing emergency services for motorists encountering minor and major accidents or incidents. At each accident scene or incident, a case description form is filled out by the ESP team, which includes data on motorist vital information, road conditions, etc. Currently, the form that is used by the ESP North team is paper-based and is submitted at the end of the work shift. The data entry operator then enters this information into the central database, where the information is collected for further analysis. The use of paper forms creates an unnecessary workload for database operators. Also, this substantial number of forms (about 400/day) exceeds the data entry capabilities of the departmental database operators, thus creating significant backlogs and delays.

This project will be divided into four main stages:

I. Environment and Technology Research. At this stage, NJDOT Operations North ESP structures (organizational, geographical, information, etc.) will be studied along with the survey of current state-of-the art in PDA technology. The data and experience from Year 1 will be fully employed at this stage: decisions will be made based on investigation of ESP North needs, technology review done for ESP South, updated technology review and observations of working ESP South data collection system.

II. Development. At this stage, PDA software and Master Database will be modified based on results of Stage I.

III. Deployment and Training. Upon completion of Stage II, ESP North incident reporting will be migrated to the new PDA-based paperless system. Training will be provided to ESP team members. Optionally, training will be provided to designated personnel who are responsible for the maintenance and troubleshooting of the PDA-based system, as it interfaces with the central server.

IV. Observation and Support. Throughout the course of the project, both ESP South and ESP North systems will be under observation. The emerging technical issues will be investigated and addressed as they come up. Additionally, research will be conducted on further improvements of the system: resolving bottlenecks, integration with GPS/GIS, etc.

Development of this hardware/software solution will utilize Windows-based PDAs to enter and store ESP incident forms in an electronic format. This will dramatically reduce the workload for database operators and provide a paperless operation for ESP personnel. This system would include the capability of easy submission of forms directly or indirectly into the central database, thus increasing the efficiency of the Division and eliminating the manual entry of information into the central database.

1. Progress this quarter by task:

8.0 Continuing observation and support

2. Proposed activities for next quarter by task:

No activities planned. Project ended August 15.



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3. List of deliverables provided in this quarter by task (product date):

8.0 (7/31/06) Support visit to Springfield – Configured and delivered one replacement PDA; installed a newer version of synchronizer onto 2 workstations; resolved a problem with PDA synchronization.

(7/31/06) Support visit to Cherry Hill – Configured and delivered two replacement PDAs; installed a newer version of synchronizer onto 2 workstations; picked up two PDAs that were not functioning.

(8/10/06) Support visit to Cherry Hill – Configured and delivered two replacement PDAs; delivered 2 wall chargers; resolved a problem with PDA scrolling; advised crew supervisors on procedure to follow when connection problems occur.

(8/10/06) Support visit to Springfield – Configured and delivered one replacement PDA; advised crew supervisors on procedure to follow when connection problems occur.

(8/14/06) Support visit to Metuchen – Installed new version of Synchronizer onto three workstations.

(8/15/06) Support visit to Hanover – Installed new version of Synchronizer onto four workstations; updated MDAC module on John Ruffino's workstation to version 2.8.

4. Progress on Implementation and Training Activities: Project is fully implemented and training is complete. Additional PDAs have been purchased to bring each of the ESP yards up to their full complement of PDAs.

5. Problems/Proposed Solutions: None

Total Project Budget	\$264,319
Modified Contract Amount:	\$264,319
Total Project Expenditure to date	\$263,649
% of Total Project Budget Expended	100%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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QUARTERLY PROGRESS REPORT

Project Title:	Pavement Resource Program		
RFP NUMBER: N/A	NJDOT RESEARCH PROJECT MANAGER: Mr. Robert Sauber		
TASK ORDER NUMBER: TO 166 / RU Acct 4-29309	PRINCIPAL INVESTIGATOR: Ali Maher		
Project Starting Date: 7/01/2005 Original Project Ending Date: 12/31/2005 Modified Completion Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Training for MEPDG	30.0%	\$ 60,000	10.0%	\$ 6,000	100.0%	\$ 60,000
2	Regional Model Calibration for the MEPDG	20.0%	\$ 40,000	25.0%	\$ 10,000	100.0%	\$ 40,000
3	Sensitivity Analysis of Traffic Inputs for MEPDG	17.5%	\$ 35,000	15.0%	\$ 5,250	100.0%	\$ 35,000
4	On-call Training/Pavement Design Support for NJDOT	17.5%	\$ 35,000	30.0%	\$ 10,500	100.0%	\$ 35,000
5	On-call Field and Laboratory Testing Services and Analysis	15.0%	\$ 30,000	25.0%	\$ 7,500	100.0%	\$ 30,000
6		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
7		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
TOTAL		100.0%	\$ 200,000		\$ 39,250		\$ 200,000

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

623 BOWSER RD. PISCATAWAY NJ 08854-8014
TEL: 732-445-0579 FAX: 732-445-0577



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- Provide the NJDOT with pavement technology support for all aspects of pavement design, analysis, and management.

1. Progress this quarter by task:

TASK 1 – Training for MEPDG

Completed

TASK 2 – Regional Calibration of MEPDG Models

Due to issues with the MEPDG software that was discussed during the last Lead States meeting, the Regional Calibration of the MEPDG models has been put on hold until the Spring of 2006, when at this time version 1.1 of the MEPDG software should be released. However, laboratory testing is still being conducted on loose field HMA mixes that have been sampled and delivered to the Rutgers Asphalt/Pavement Laboratory (RAPL). The test results will be utilized to provide a database/catalog of dynamic modulus and creep compliance data. This is discussed further under Task 5.

TASK 3 – Sensitivity Analysis of Traffic Inputs for the MEPDG

Completed

TASK 4 – On-Call Training/Pavement Design Evaluation for the MEPDG

Completed

TASK 5 – On-Call Field and Laboratory Testing Services and Analysis

Completed

2. Proposed activities for next quarter by task:

The proposed activities for the next quarter is currently being developed by Robert Sauber, Robert Blight, and Josh Davis of the NJDOT Pavement Design group. CAIT is awaiting the task order and its related tasks.

Based on recent discussions with the Pavement Technology Unit, the following tasks are being planned for the future task order:

- Revamping of NJDOT Pavement Management Decision software
- Evaluation of Walk-Behind IRI Devices and the Development of a Custom-Built IRI System
- Development of a Pavement Tracking System
- Traditional and Advanced GPR Testing to Upgrade the NJDOT's As-Built Database
- Visual Verification of Remaining Service Life Determination and Its Recommended Treatment and Estimated Cost
- IT Support for the Pavement Technology Unit's Data Storage System

3. List of deliverables provided in this quarter by task (product date):

N.A.

4. Progress on Implementation and Training Activities:

N.A.

5. Problems/Proposed Solutions:

N.A.



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Total Project Budget	\$200,000
Modified Contract Amount:	
Total Project Expenditure to date	\$200,000
% of Total Project Budget Expended	100%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	New Jersey State LTAP Technology Transfer Center		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj	
TASK ORDER NUMBER:		PRINCIPAL INVESTIGATOR: Dr. Ali Maher	
Project Starting Date: 01/01/2006 Original Project Ending Date: 12/31/2006 Modified Completion Date:		Period Covered: 3rd Quarter 2006	

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	14.3%	\$ 20,000	0.0%	\$ -	100.0%	\$ 20,000
2	Compile and Maintain Mail List	10.9%	\$ 15,196	40.0%	\$ 6,078	90.0%	\$ 13,676
3	Publish Monthly Newsletter	18.1%	\$ 25,326	25.0%	\$ 6,332	75.0%	\$ 18,995
4	Distribute Technology Transfer Materials	15.9%	\$ 22,202	15.0%	\$ 3,330	75.0%	\$ 16,652
5	Provide Technical Assistance	27.2%	\$ 38,083	25.0%	\$ 9,521	75.0%	\$ 28,562
6	Provide Training	5.3%	\$ 37,439	50.0%	\$ 18,720	50.0%	\$ 18,720
7	Evaluate Effectiveness of Program	8.4%	\$ 11,754	0.0%	\$ -	100.0%	\$ 11,754
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 170,000		\$ 43,980		\$ 128,358

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Project Objectives:

The Local Technical Assistance Program (LTAP) seeks to conduct several tasks that will promote best practices and implement state-of-the-art technologies to county and municipal transportation agencies. These activities include training, materials distribution, newsletter publication, technical assistance, and program evaluation. The objectives of this project are to continue to diversify and expand the customer base, deliver quality customer service, communicate the program values to partners and clients, and enhance the technology transfer network, through the activities of the Local Technical Assistance Program (LTAP).

Project Abstract:

The Local Technical Assistance Program (LTAP) will maintain mailing lists, publish a monthly newsletter, provide technical assistance, provide training, and evaluate the effectiveness of the program on an ongoing basis throughout the project.

The anticipated results are the creation of a library special collection made available on the LTAP website, monthly newsletter publication, an updated fax/e-mail directory for the transportation field, expanded training programs and additional conferences, and increased involvement with pertinent professional organizations.

1. Progress this quarter by task:

A. Compile and Maintain Mail List

The contact list database was updated to include 170 new public works and utilities authorities email contacts and 175 municipal engineering email contacts to the email distribution list. In addition, 4 contacts were added by individual request. New contacts were obtained from technical assistance requests. An updated list of municipal public works mailing addresses was created. This list contains 625 addresses.

B. Publish Monthly Newsletter

Approximately 3,000 individuals received each issue of the newsletter. Three issues of the newsletter were produced during this quarter. Electronic distribution of the newsletter occurred via e-mail.

Volume 8, Number 7 was published in July 2006. The first edition of the quarter included articles on the resignation of USDOT Secretary Mineta, the Municipal Engineering Construction Inspection Program Graduation, Incident Command System training for water utilities, NJDOT local aid to municipalities and counties, urban highway rehabilitation, Garret



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Morgan Academy scholarship winner, and New Jersey Department of Community Affairs SHARE program. The Professional Development Corner featured team building. This issue's *Free for the Asking* offering was SAFETEA-LU: A Guide to Provisions Related to Local Government, a publication released by the American Public Works Association (APWA).

Volume 8, Number 8 was published in August 2006. This issue featured information on transportation solutions to high ozone conditions, the 2nd Annual Traffic Engineering and Safety Forum, the EPA handbook on total coliform rule, graduated driver licensing and its impact on reducing fatal crashes, metropolitan planning requirements, and career advancement. The Professional Development Corner highlighted the topic of advanced degrees. This month's *Free for the Asking* was National Strategy to Reduce Congestion on America's Transportation Network, a publication released by the United States Department of Transportation.

Volume 8, Number 9 was published in September 2006. The third issue of the quarter contained articles about the quarter included articles on "Safe at any Speed", Mechanistic-Empirical Design Guide, the historical legacy of John Roebling, National NeighborWoods month, U.S. Department of Homeland Security (DHS) Commercial Equipment Direct Assistance Program (CEDAP) and the New FHWA Website to Help Strengthen Transportation Planning and Environment Linkages. This issue's *Free for the Asking* offering was Guidelines for the Collection of Long-Term Pavement Performance Data, published by the Federal Highway Administration (FHWA).

C. Distribute Technology Transfer Materials

512 technical publications were distributed during this quarter. Technology transfer materials were distributed during training seminars, workshops, and *Free for the Asking* requests via the newsletter. In addition, specific requests were made by customers for technical publications, which were duplicated and distributed.

D. Provide Technical Assistance

There were 297 instances of technical assistance provided by the LTAP staff. Requests were received via telephone, e-mail, mail, and fax.

E. Provide Training

Training has occurred this quarter in the following program areas: Road Scholar I and an assortment of transportation and infrastructure related seminars, as well as various programs offering Continuing Education Units (CEUs) for New Jersey Certified Public Works Managers. During this quarter, 428 individuals were trained via 22 programs.



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Revision of several programs occurred during this quarter. Course content for Shared Services and Privatization, Managing Public Equipment, Winter Maintenance, and Preventive Maintenance were modified.

F. Evaluate Effectiveness of Program

During this quarter, several meetings with internal staff, sponsoring agencies, and partnering agencies have been conducted to evaluate the program's current and future direction. A meeting was conducted with the National LTAP Program Manager to discuss the New Jersey program's status. Identification of the membership of the Stakeholder committee was completed in September. The first meeting of this group will be in October 2006.

Training program effectiveness was measured by use of course evaluations completed by participants at the end of each training program. Participants were asked to rate the overall quality of the course content, instructor, and presentation of the materials. Participants consistently rated the programs as having met or exceeded their expectations and as being one that they would recommend to others.

Development of several new operating procedures has begun. Modified instructor review forms, as well as cost-benefit analysis for training programs will begin in 2007.

The program will begin a strategic planning process in either the last quarter of 2006 or the first quarter of 2007.

2. Proposed activities for next quarter by task:

A. Compile and Maintain Mail List

The mail list will be continually be updated on an as needed basis.

B. Publish Monthly Newsletter

The newsletter will remain on a monthly publishing schedule.

C. Distribute Technology Transfer Materials

Technology transfer materials will be distributed during training programs, and by request. The lending library is always available. Materials will be distributed at the League of Municipalities Conference in November 2006.



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D. Provide Technical Assistance

Technical assistance will be provided in response to any inquiries made via telephone, fax, or e-mail.

E. Provide Training

Training programs are scheduled for the next quarter as follows:

Traffic Control Coordinator Program
Road Scholar One Program
Road Scholar Two Program
Transportation/Infrastructure Seminars

F. Evaluate Effectiveness of Program

Evaluations will continue to be distributed at each program.

An Advisory Committee meeting will be held to review the project's financial status and progress once each quarter.

A Steering Committee meeting will be held every other month and/or on an as-needed basis to review program activities and initiatives, as well as to set long-term goals.

A Stakeholder meeting will be held during this quarter to evaluate stakeholder satisfaction and allow an open forum for the exchange of ideas, questions, and comments.

3. List of deliverables provided in this quarter by task (product date):

A. Compile and Maintain Mail List

New Email Contacts	July-September 2006
2006 Updated Public Works Mail List	August 2006

B. Publish Monthly Newsletter

Volume 8, Number 7	July 2006
Volume 8, Number 8	August 2006
Volume 8, Number 9	September 2006



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C. Distribute Technology Transfer Materials	Ongoing
D. Provide Technical Assistance	Ongoing
E. Provide Training	
New Diesel Emission Standards	July 26, 2006
Stone Mastic Asphalt Refresher	August 14, 2006
First Responders- Working with Utilities	August 17, 2006
Selection of Snow and Ice Materials to Mitigate Environmental Impact	September 7, 2006
Do it Yourself Solutions that Really Work	September 7, 2006
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Preventive Maintenance	September 20, 2006
Drainage Maintenance: the Key to Roads that Last	September 27, 2006
Asphalt Roads: Common Maintenance Problems	September 27, 2006
Traffic Signal Design	September 27, 2006
F. Evaluate Effectiveness of Program	Ongoing
Stakeholder Committee Identification	September 2006

4. Progress on Implementation and Training Activities:

All of the activities of this technology transfer project, and their implementation dates are included above.

5. Problems/Proposed Solutions:



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Total Project Budget	\$170,00.00
Modified Contract Amount:	
Total Project Expenditure to date	\$128,358
% of Total Project Budget Expended	76%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	New Jersey State LTAP Technology Transfer Center		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj	
TASK ORDER NUMBER:		PRINCIPAL INVESTIGATOR: Dr. Ali Maher	
Project Starting Date: 01/01/2006 Original Project Ending Date: 12/31/2006 Modified Completion Date:		Period Covered: 3rd Quarter 2006	

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1	Mobilization	22.0%	\$ 11,000	0.0%	\$ -	100.0%	\$ 11,000
2	Compile and Maintain Mail List				\$ -		\$ -
3	Publish Monthly Newsletter				\$ -		\$ -
4	Distribute Technology Transfer Materials				\$ -		\$ -
5	Provide Technical Assistance				\$ -		\$ -
6	Provide Training	67.2%	\$ 33,585	25.0%	\$ 8,396	100.0%	\$ 33,585
7	Evaluate Effectiveness of Program	10.8%	\$ 5,415	0.0%	\$ -	100.0%	\$ 5,415
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 50,000		\$ 8,396		\$ 50,000

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Volume 8, Number 9	September 2006



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C. Distribute Technology Transfer Materials	Ongoing
D. Provide Technical Assistance	Ongoing
E. Provide Training	
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Stone Mastic Asphalt Refresher	August 14, 2006
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F. Evaluate Effectiveness of Program	Ongoing
Stakeholder Committee Identification	September 2006

4. Progress on Implementation and Training Activities:

All of the activities of this technology transfer project, and their implementation dates are included above.

5. Problems/Proposed Solutions:



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Total Project Budget	\$50,000.00
Modified Contract Amount:	
Total Project Expenditure to date	\$50,000
% of Total Project Budget Expended	100%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	The New Jersey Local Police Technical Assistance Program		
RFP NUMBER: N/A	NJDOT/FHWA RESEARCH PROJECT MANAGER(S): Pat Ott		
TASK ORDER NUMBER/Study Number: Task Order No. 143/ 4-29062	PRINCIPAL INVESTIGATOR: Ali Maher/Joe Orth/Claudia Knezek		
Study Start Date: 8/5/2003 Study End Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Year 1: 2005 Tasks	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1.0 Literature Search	20	50	100	20
1.1 Conduct research	10	40	100	10
2.0 Survey	5	0	100	5
2.1 Conduct Survey	5	0	100	5
3.0 Technical Assistance/Tech Transfer	10	50	100	10
3.1 Maintain Mail Lists	5	0	100	5
3.2 Publish Newsletter	10	90	100	10
3.3 Provide Technical Assistance	15	50	100	15
4.0 Provide Training	20	50	100	20
TOTAL	100			100 %
Year 2: 2006 Tasks	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1.0 NJTR-1 Training (75%)				
1.1 Revise Training Material				
1.1.1 Revise Instructor Manual	5	70	80	4
1.1.2 Revise Field Manual	5	70	80	4
1.1.3 Revise Instructor Presentation	5	30	40	2
1.1.4 Create New CDs	5	30	40	2
1.2 Develop E-Learning Tool	40	0	75	30
1.3 Host 8 Additional Training Sessions	15	0	0	0
2.0 Offer Technical Assistance for Locals (15%)				
2.1 Distribution Service	15	.5	.5	.75
3.0 Support NJDOT's Goal (10%)				
3.1 Attend State/Federal Meetings	10	20	75	7.5
	100			50.25 %



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Project Objectives: The Police Technical Assistance Program (PTAP) is responsible for the following:

1. To provide a clearinghouse for law enforcement agencies to access information on advancements being made in the crash records field.
2. To showcase NJDOT methodologies, research, and technology initiatives in crash records systems.
3. To offer technical assistance to Local police departments.
4. To support the NJDOT's goal of reaching local government agencies through CAIT-LTAP technology transfer activities.

Project Abstract: There is a need for the FHWA vital few strategic goals to be introduced to local government through training outreach and distribution of resources. Accurate reporting, processing, and maintaining of crash data is a priority for NJDOT to develop effective solutions to traffic safety problems. Staff members of the NJ LTAP program will serve as representatives to the Safety Management Task Force and the Statewide Traffic Records Coordinating Committee (STRCC). Additionally, the LTAP staff members will facilitate quarterly local task force meetings for representatives from local law enforcement associations. The outcome of this program is to increase the accuracy of crash reports that are submitted to the NJDOT for inclusion in the statewide Crash Records Database.

1. Progress this quarter by task:

Task	Description
1.1.1 Revise Instructor Manual	Paper mock up of requested changes submitted to Bill Beans for approval. Submission to consultant for incorporation into multimedia training material anticipated in September.
1.1.2 Revise Field Manual	Paper mock up of requested changes submitted to Bill Beans for approval. Submission to consultant for incorporation into multimedia training material anticipated in September.
1.1.3 Revise Instructor Presentation	Changes in Instructor Manual tracked for corresponding changes to Instructor Presentation.
1.3.4 Create New CDs	Preparation of information to be contained on CDs appears in tasks noted above.
2.1 Distribution Service	Requested copy of the existing training material was distributed.
3.1 Attend State/Federal Meetings	Quarterly Review Meeting w/Pat Ott (8/16); Change Approval Meeting w/Bill Beans (8/24).



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2. Proposed activities for next quarter by task:

Task	Proposed Activities
1.1.1 Revise Instructor Manual	Complete Instructor Manual update as requested.
1.1.2 Revise Field Manual	Complete Field Manual update as requested.
1.1.3 Revise Instructor Presentation	Complete revision of Instructor Presentation to conform to Instructor Manual update.
1.1.4 Create New CDs	Burn CDs from updated Instructor Manual, Field Manual, and Instructor Presentation.
1.2.0 Develop E-Learning Tool	Complete development of the E-Learning Tool based on changes noted in tasks above.
1.3.0 Host 8 Additional Training Sessions	Schedule and host additional training sessions in 8 geographic locations throughout the state.
2.1.0 Distribution Service	Distribute training materials at the training sessions, and post Instructor and Field Manual updates on-line accompanied by a History of Changes. Distribute updated CDs upon request.
3.1.0 Attend State/Federal Meetings	Attend regularly scheduled Quarterly Review Meetings.

3. List of deliverables provided in this quarter by task (product date):

Task	Description
4.1 Attend State/Federal Meetings	<ul style="list-style-type: none">• (8/16/06) Quarterly Report review meeting with Pat Ott. Distributed Quarterly Report and supporting documentation.• (8/24/06) Progress meeting with Bill Beans, Claudia Knezek, Janet Hansen.

4. Progress on Implementation and Training Activities

Training	Description
1.3.0 Host 8 Additional Training Sessions	Training suspended until all requested updates to the training material have been completed.

Problems/Proposed Solutions: None at this time.



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Total Project Budget	\$668,075
Modified Contract Amount:	\$668,075
Total Project Expenditure to date	\$560,127
% of Total Project Budget Expended	83%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate accounting, please review the quarterly invoice for this project.



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QUARTERLY PROGRESS REPORT

Project Title:	Manual of Guidelines for Inspection of ITS Equipment and Facilities		
RFP NUMBER:			NJDOT RESEARCH PROJECT MANAGER: Nahzat Aboobaker
TASK ORDER NUMBER: TO 181 / RU Acct 4-26652			PRINCIPAL INVESTIGATOR: Dr. Kaan Ozbay
Project Starting Date: 1/1/2006 Original Project Ending Date: 12/31/2007 Modified Completion Date:	Period Covered: 3 rd quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	4.18%	\$ 15,000.00	0.0%	\$ -	100.0%	\$ 15,000
2	Literature Search	2.79%	\$ 10,000.00	0.0%	\$ -	100.0%	\$ 10,000
3	Literature Review	8.37%	\$ 30,000.00	30.0%	\$ 9,000	30.0%	\$ 9,000
4	Manual Outline	5.81%	\$ 20,824.00	0.0%	\$ -	0.0%	\$ -
5	Manual Sections	26.41%	\$ 94,659.00	0.0%	\$ -	0.0%	\$ -
6	Individual Sections	19.53%	\$ 70,000.00	0.0%	\$ -	0.0%	\$ -
7	Software	11.16%	\$ 40,000.00	5.0%	\$ 2,000	5.0%	\$ 2,000
8	Training Plan	5.58%	\$ 20,000.00	0.0%	\$ -	0.0%	\$ -
9	Training Implementation	10.60%	\$ 38,000.00	0.0%	\$ -	0.0%	\$ -
10	Final Report and QR	5.57%	\$ 20,000.00	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.0%	\$ 358,483		\$ 11,000		\$ 36,000

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Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

1. Develop a complete Manual of Guidelines for the acceptance, inspection, testing and maintenance of ITS equipment and facilities by knowledgeable and experienced NJDOT personnel and or subcontractors.
2. Develop a field inspection check-list, condition survey to achieve the first goal. These should then be implemented as a computer based application so that they can be installed on PDAs for ease of use in the field.
3. Develop a computerized ITS Maintenance Management System. This system should be installed on desktop computer at the TOC and should contain the documentation for all of the inspection,



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survey and maintenance procedures, required subsystem spares, spare parts that , are available in the TOCs.

4. Computerized ITS Maintenance Management System should possess the capability for generating various condition reports, system and subsystem status, life prediction scenarios that can be ultimately for budget projections and preparation.
5. Provide for the upgrading of the guidelines that can be employed as designs, subsystems change and new ones are added, etc.
6. Train forty personnel in the use of the Manual and the software.

Project Abstract:

NJDOT does not currently have ITS acceptance and maintenance inspection manual (NJDOT RFP - Project 2005-13). This manual is needed as a reference document to assist the Department's inspectors, ITS design and traffic operations and ITS maintenance personnel to ensure effective inspection of ITS facilities. This manual should be a comprehensive reference document that has separate installation (construction) and maintenance sections.

1. Construction section should definitely cover the following areas (but should not be limited to these only):
 - installation and repair of fiber optic communications lines including cable pulling, jetting, splicing, termination cables, patch panels, test equipment,
 - use of approved drawings and catalogue cut submissions, CCTV's, camera poles, VMS's, HAR systems, system detectors, tag readers,
 - energizing the cabinet, backup power,
 - wiring of ITS devices in the field and at the Traffic Operation Center (TOC), component integration into existing systems,
 - documentation and verification of ITS device communication protocols.
2. Maintenance sections will cover the following areas (but should not be limited to these only):
 - training by contractors,
 - acceptance testing,
 - maintenance schedules for ITS systems and devices,
 - troubleshooting, spare parts inventory, configuration management and disaster recovery, etc.

A wide variety of engineers including civil, mechanical, electrical, software and computer, and communication engineers, are required to design and construct ITS facilities. ITS device manufacturers, system vendors, suppliers, and contractors, etc., develop and provide drawings, guides, manuals, inspection procedures, maintenance procedures. Thus, there is a vast amount of knowledge that is needed to be extracted and then incorporated into a Manual of Guidelines for effective Inspection of ITS Facilities by knowledgeable, experienced NJDOT and well-trained inspectors and or subcontractors. The major goal of this project is to provide the tools necessary to inspect and maintain New Jersey's ITS facilities to these stakeholders.

1. Progress this quarter by task:

- **Task 2: Literature Review:**

Below a summary of our efforts in this quarter:

- We continued our review of the available literature related to manual preparation.
- We prepared a draft literature review report and submitted it to NJDOT contacts for comments.



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- We received additional documents and information related to available reports and manuals from NJDOT. Then, we incorporated this new information in our literature review report.
 - We prepared a survey to identify existing knowledge and expertise with respect to the preparation of the ITS manual.
 - We met the NJDOT project contacts to discuss our findings so far and the survey.
 - Survey was reviewed by NJDOT contacts and then revised according to their comments.
 - Revised survey is being sent to the main contacts provided by NJDOT.
- **Task 7: Software**
 - We started to build a software implementation architecture in terms of the work flow of the final software tool. (Note: We started this task earlier than scheduled in our proposed schedule to ensure timely delivery).
 - We also started to implement a sample shell to demonstrate this work flow.

2. Proposed activities for next quarter by task

- We will finalize Task 2 and continue to work on Tasks 3 and 7.

3. List of deliverables provided in this quarter by task (product date)

- Draft literature review report.
- During this quarter, on July 27th, 2006, we met with NJDOT project contacts to discuss the survey and our information needs. We also met with NJDOT project manager on July 17th 2006, to give update on our progress.

4. Progress on Implementation and Training Activities

5. Problems/Proposed Solutions

We have received the contract in April, 2006. Upon receiving the executed contract and the account number, we met with ORA to discuss the tasks and the sub-contract. ORA submitted a detailed work plan which was reviewed. Comments on their work plan were submitted to ORA. A subcontract will be issued based on the revised work plan.

Total Project Budget	358,483
Modified Contract Amount:	
Total Project Expenditure to date	36,000
% of Total Project Budget Expended	10.0%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Implementation of CQA Measures for Harbor Sediments and Processed Dredged Material (PDM) Placement		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Michael Riley		
TASK ORDER NUMBER: TO 160 /RU 4-29217	PRINCIPAL INVESTIGATOR: Maria Boile		
Project Starting Date: November 2004 Original Project Ending Date: November 2005 Modified Completion Date: July 2006	Period Covered: 3 rd Quarter of 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
1. Review of Permits, Contracts, Test Results	5	100	100	5
2. Periodic Visits at the site	70	50	100	70
3. Preparation of Reports	25	30	80	20
TOTAL				95

Project Objectives:

Project Abstract:

1. Proposed activities for next quarter by task: Review of QA testing, Completion of the Final Report
2. List of deliverables provided in this quarter by task (product date): Daily reports and pictures are posted online
3. Progress on Implementation and Training Activities:
4. Problems/Proposed Solutions: Elaborations on problems and solutions are included in the Daily Reports

Total Project Budget	1 Year	\$31,988
Modified Contract Amount:		\$31,988
Total Project Expenditure to date		\$31,988
% of Total Project Budget Expended	Year 1 and 2	100%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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QUARTERLY PROGRESS REPORT

Project Title:	Engineering Management Consulting Services	
RFP NUMBER: Not Applicable		NJDOT/FHWA RESEARCH PROJECT MANAGER(S): Richard Crum
TASK ORDER NUMBER/Study Number: Task Order No. 124 / 4-26789		PRINCIPAL INVESTIGATOR: Ali Maher/Joe Orth/Pat Szary
Project Starting Date: 5-29-03 Original Project Ending Date: 5-28-05 Modified Completion Date: 5/28/2007		Period Covered: 3rd Quarter 2006

Task
1.0 Partnering
2.0 Meeting Facilitation
3.0 Organizational Development Efforts
4.0 Industry Relations Facilitation
5.0 Task Forces Facilitation

Project Objectives: The purpose of this project is to manage experts in the areas of facilitation of departmental/industry/University initiatives, pre construction partnering, pre design partnering and public meeting facilitation, Engineering Unit strategic planning, and industry and University task force facilitation and deployment. These experts will provide Engineering Management Consulting Services to the NJDOT Capital Program

Project Abstract: The Capital Program Management Division of the New Jersey Department of Transportation requires that expert and experienced personnel participate in their projects. With the recent retirement of so many NJDOT personnel there exists a shortage of qualified individuals to facilitate the work.

The research plan to provide Engineering Management Consulting services to the Department of Transportation will include:

1. Facilitation of Departmental/Industry/University Initiatives: Examples include Bridge Footprint Program, Local Bridge Design Standards, Congestion Management, Pavement Management, Safety Management Systems
2. Pre Construction Partnering
3. Pre Design Partnering and public meeting facilitation
4. Engineering Unit strategic planning
5. Industry and University task force facilitation and deployment

The final product of this work will consist of providing the New Jersey Department of Transportation with the necessary experts to conduct engineering management consulting.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
623 BOWSER RD. PISCATAWAY, NJ 08854-8014
TEL: 732-445-0579 FAX: 732-445-0577

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Progress this quarter by task:

No activity has occurred this quarter.

Proposed activities for next quarter by task

Project is temporarily "on hold" at the request of NJDOT.

List of deliverables provided in this quarter by task (product date)

No activity has occurred this quarter

Progress on Implementation and Training Activities

Not applicable.

Problems/Proposed Solutions

None at this time.

Total Project Budget	\$200,000
Modified Contract Amount:	\$200,000
Total Project Expenditure to date	
% of Total Project Budget Expended	

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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Monitoring of Construction Doremus Avenue Bridge Structure		
RFP NUMBER: N/A	NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj		
TASK ORDER NUMBER: 99 / 4-26676	PRINCIPAL INVESTIGATOR: Hani Nassif		
Project Starting Date: 01/01/2001 Original Project Ending Date: 12/31/2004 Modified Completion Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	2%	0%	100%	2%
1. Finite Element Model Development and verification (Substructure & Superstructure)	5%	0%	100%	5%
2. Develop Instrumentation Plan and Install Sensors for LMC and Stage II sensors	20%	0%	100%	20%
3. Parametric Study	15%	0%	100%	15%
4. Perform Testing of LMC layers, Stage I and II before and After LMC, Monitoring and Data Collection	20%	0%	100%	20%
5. Prepare Recommendations to Modify AASHTO's, NJDOT's and LMC Procedures	20%	0%	90%	18%
6. Comparison of Analytical and Experimental Results including LMC layer	8%	5%	100%	8%
7. Progress Reports	5%	0%	100%	5%
8. Fatigue Data Collection and Live Load Model *	20%	30%	80%	16%
Final Report	5%	20%	90%	4.5%
TOTAL	120%			113.5 (113.5/120 = 95%)

*Added Task

Project Objectives:

The Doremus Avenue bridge structure, located in Newark, NJ, is New Jersey's initial LRFD design. The construction project will involve replacement of an existing bridge structure that primarily carries truck traffic into the State's seaport area. The main objective of the overall five-year study is to instrument, monitor and evaluate the structure during and after construction. The evaluation process aims at assessing the new AASHTO LRFD design procedures and identifying what the New Jersey Department of Transportation (NJDOT) wishes to establish as future bridge design guidelines. The instrumentation schemes will be implemented during the construction phase. This will permit measuring the "undisturbed" behavior of the bridge and establishing the structure's "finger prints" prior to traffic opening. Both the superstructure and substructure will be instrumented and monitored simultaneously.

Project Abstract:

In 2002, the American Association of State Highway Transportation Officials (AASHTO) will adopt the Load and Resistance Factored Design (LRFD) Bridge Design Specifications as the standard by which all-future bridge structures will be designed. The use of these Specifications will be mandatory for all States. New Jersey has



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committed to the adoption of the LRFD Specifications by January 2000. The LRFD Specifications considers the variability in the behavior of structural elements through the use of extensive statistical analyses to ascertain the behavioral variability. The LRFD Specifications continue to be refined and improved. However, many of the Specifications' design approaches and methodologies have been adopted with limited or virtually no experimental validation. Therefore, there is a need to validate these new design procedures and models as well as to validate the integrity of LRFD designed bridge structures.

It is anticipated that the bridge will be instrumented to monitor its performance over a period of several years (5 years). It is also envisioned that the Doremus Avenue Bridge will act as a national "test bed" for verifying certain parameters of the AASHTO LRFD Bridge Design Specifications. The following sections describe the objective, scope, and tasks involved in developing analytical models and planning instrumentation schemes and sensor locations prior to the actual construction of the Doremus Ave. Bridge. The presented plan covers the first year of the project only. However, it is expected that the study will continue to allow for instrumentation, field-testing and long term monitoring. The overall project over the five-year period will consist of three Phases as follows:

- Phase I: Bridge Modeling, Instrumentation Planning, and Coordination of Tasks.
- Phase II: Bridge Instrumentation, Testing, and Verification prior to traffic opening.
- Phase III: Bridge Testing and long-term Monitoring after traffic opening.

1. Progress this quarter by task:

A. Live Load data and WIM System

1. Continue to collect and download WIM system data on truck weights and classification.
2. Visited the Doremus Avenue bridge site and checked all sensors including the accelerometers.
3. Truck load data from other WIM sites in New Jersey are analyzed for multiple presence statistics and compared to those observed at Doremus Avenue Bridge WIM data.

B. Fatigue System

1. Continue to collect and download stress data.
2. The effect of having trucks in multiple presence (e.g., Side-by-side, following in the same lane, and staggered in both lanes) are compared to current code assumptions for purposes of fatigue and strength design proposed for single.
3. Data from additional bridge sites has been considered on i195 and Turnpike bridges. Data collected from other sites will be compared with those on Doremus Avenue Bridge.

C. Final Report

1. A draft report now includes fatigue load model and live load data analysis and modeling from WIM on Doremus Bridge and other WIM sites in NJ.

D. Budget

E. Others

1. N/A

2. Proposed activities for next quarter by task:

1. Finalize and update draft report so that it could be circulated.
2. Continue to collect and check truck weight data from Doremus Avenue Bridge and other bridges.

3. List of deliverables provided in this quarter by task (product date):

N/A

4. Progress on Implementation and Training Activities:

N/A



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5. Problems/Proposed Solutions:

1. A request for the telephone communication to download WIM data using cellular modem was submitted to Rutgers Purchasing. Rutgers did not approve purchase of cellular line since it is outlined as a budget item in original budget. There is a need to acquire permission of NJDOT for Rutgers Accounting and Purchasing to approve the purchase.
2. Access to the Victory Bridge sites.

Total Project Budget	\$963,542
Modified Contract Amount:	
Total Project Expenditure to date	\$963,542
% of Total Project Budget Expended	100.0%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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QUARTERLY PROGRESS REPORT

Project Title:	Concrete Shrinkage Analysis for Bridge Deck Concrete		
RFP NUMBER: 2005-04	NJDOT RESEARCH PROJECT MANAGER: Anthony Chmiel		
TASK ORDER NUMBER: TO 180 / RU Acct 4-26545	PRINCIPAL INVESTIGATOR: Dr. Husam Najm		
Project Starting Date: 1/1/2006 Original Project Ending Date: 12/31/2006 Modified Completion Date:	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	15.0%	\$ 22,000.00	20.0%	\$ 4,400	80.0%	\$ 17,600
2	Literature Search	4.0%	\$ 6,000.00	10.0%	\$ 600	80.0%	\$ 4,800
3	Identify all NJDOT mixes used in decks and those that exhibited cracking	7.0%	\$ 10,000.00	20.0%	\$ 2,000	45.0%	\$ 4,500
4	Prepare mixes and perform AASHTO PP34-99 test on each mix	32.0%	\$ 47,290.00	25.0%	\$ 11,823	50.0%	\$ 23,645
5	Prepare a list of cracking potential for each mix	3.0%	\$ 4,500.00	20.0%	\$ 900	20.0%	\$ 900
6		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
7		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20	Final Report and Quarterly Reporting	39.0%	\$ 58,906.00	15.0%	\$ 8,836	30.0%	\$ 17,672
	TOTAL	100.0%	\$ 148,696		\$ 28,558		\$ 69,117

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Green text is updated ever quarter

Black text is automatically updated or static



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Project Objectives:

The objectives of this study are to: 1) Evaluate the shrinkage potential properties of concrete mixes which are currently being used for bridge deck applications in New Jersey using the AASHTO PP 34-99 test method and 2) Provide a list of all tested mixes from the lowest cracking potential to the highest.

Project Abstract:

For many years, scientists and engineers have been improving on the development of concrete technology. Concrete is no longer a simple material that only includes cement, water, and aggregates but a more involved mixture. Many pozzolanic materials (such as silica fume, and fly ash) and chemical admixtures (such as superplasticizers and air entraining agent) are being added to improve the quality of the concrete. However, there is a concern the compressive strength no longer constitutes the only criterion in specifying the concrete, but other factors, such as shrinkage and durability, become more pronounced. HPC has been developed to highlight the durability of concrete. Technical specifications have been developed to ensure the best performance of High Performance Concrete (HPC). However, it has been observed by State Engineers that many bridge decks are exhibiting cracking soon after being poured. A test has been developed by AASHTO (PP 34-99, The Passive or Restrained Ring Test) that measures the cracking potential of a concrete mix. This cracking tendency test needs to be performed on all NJDOT current and experimental mixes used for bridge decks to identify those mixes that exhibit high cracking tendencies.

1. Progress this quarter by task:

- **Seven out of sixteen trial mixes were made and tested.**
- **New rational method for calculating cracking potential was developed since majority of these mixes did not crack.**
- **Evaluate the effect of curing on restrained shrinkage**

2. Proposed activities for next quarter by task:

- **Compare the cracking potential results with actual field survey data.**
- **Continue to prepare the mixes in the lab and perform the shrinkage tests and other related tests such as strength, modulus, etc...**

3. List of deliverables provided in this quarter by task (product date):

- **List of the 16 mixes already complied from NJDOT.**
- **Results from tests on the raw materials**
- **Results of shrinkage tests and other tests already performed on the complied mixes.**

4. Progress on Implementation and Training Activities:



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5. Problems/Proposed Solutions:

Total Project Budget	\$148,696
Modified Contract Amount:	
Total Project Expenditure to date	\$69,117
% of Total Project Budget Expended	46.5%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Self Compacting Concrete		
RFP NUMBER: 2003-014	NJDOT RESEARCH PROJECT MANAGER: Anthony Chmiel		
TASK ORDER NUMBER: TO 164 / RU Acct 4-29355	PRINCIPAL INVESTIGATOR: Dr. Husam Najm		
Project Starting Date: 1/1/2005 Original Project Ending Date: 12/31/05 Modified Completion Date: 12/31/06	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
2	Literature Search	5.5%	\$ 3,000.00	0.0%	\$ -	100.0%	\$ 3,000
3	Identify Existing SCC Mix Designs (Mixes of NJDOT Suppliers)	1.9%	\$ 1,000.00	10.0%	\$ 100	100.0%	\$ 1,000
4	Testing of Fresh and Hardened Concrete	35.6%	\$ 19,651.00	30.0%	\$ 5,895	90.0%	\$ 17,686
5	Field Collection and Testing of Specimens	7.3%	\$ 4,000.00	10.0%	\$ 400	87.0%	\$ 3,480
6		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
7		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20	Final Report and Quarterly Reporting	49.7%	\$ 27,650.00	15.0%	\$ 4,148	87.0%	\$ 24,056
	TOTAL	100.0%	\$ 55,301		\$ 10,543		\$ 49,221

Blue text is entered once at the beginning of the project

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Project Objectives:

Identify existing SCC mix designs and perform laboratory tests on existing mix designs of SCC, NC, and HPC to evaluate its physical and mechanical properties and durability. These tests will include: strength and modulus, autogenous and drying shrinkage, freeze-thaw resistance, rapid chloride permeability, scaling resistance, and creep.

Project Abstract:

The self-compacting concrete is a very important material that will have a major impact on the concrete industry similar to HPC. Several states and organization have initiated research on this material and this is just the beginning in this field and it is very important to research and evaluate this material to develop draft recommendations for technical specifications and/or acceptance guidelines for SCC mix design, testing, material handling and placement, curing, and long-term durability. The research team will perform laboratory tests on existing mix designs of SCC to evaluate its physical and mechanical properties and durability and compare it to those NC and HPC. These tests will include: strength and modulus, autogenous and drying shrinkage, freeze-thaw resistance, rapid chloride permeability, scaling resistance, and creep.

1. Progress this quarter by task:

- **New structural mixes were tested for creep and shrinkage. These mixes are similar to HPC mixes with slight variation to ensure SCC behavior.**
- **Creep of SCC using various parameters has been performed. The effect of SF, FA, Loading age, and water cement ratio has been considered.**
- **More creep test results from the from the Fort Miller Mixes.**

2. Proposed activities for next quarter by task:

- **Continue monitoring the creep performance of SCC Mixes with various parameters.**
- **Need to coordinate efforts with Materials and Structural Bureau to finalize a plan for Phase II: drilled shaft testing. Use of SCC is becoming a frequently requested item by various contracts.**

3. List of deliverables provided in this quarter by task (product date):

- **Results of field samples of NJDOT SCC mix one, two, and three.**
- **Draft of Phase I Report by end September.**

4. Progress on Implementation and Training Activities:

5. Problems/Proposed Solutions:

- **All NJDOT SCC mixes are non-structural mix and have exhibited poor performance in creep and durability when comparing to HPC. The overall structural performance of such mixes does not warrant continuing with the testing but to rather concentrate on the SCC mixes developed thus far at Rutgers University. These mixes are emulated from previous HPC mixes used in bridge and other applications.**



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- Since segregations were observed on all three mixes, it is recommended more test be performed under field conditions but other type of mixes if possible. Or example, Rutgers should perform a demo for the drilled shaft mix and evaluate it for segregation. This is needed for the second Phase of the project.

Total Project Budget	55,301
Modified Contract Amount:	
Total Project Expenditure to date	49,221
% of Total Project Budget Expended	89%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Simple Bridge Security Inspection		
RFP NUMBER: 2005-16	NJDOT RESEARCH PROJECT MANAGER: Anthony Chmiel		
TASK ORDER NUMBER: TO 178 / RU Acct 4-26553	PRINCIPAL INVESTIGATOR: Dr. Hani Nassif		
Project Starting Date: 01/01/2006 Original Project Ending Date: 10/31/2006 Modified Completion Date:	Period Covered: 3 rd Quarter 2006		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	5.0%	\$ 8,236.00	50.0%	\$ 4,118	100.0%	\$ 8,236
2	Literature Search	7.0%	\$ 11,000.00	35.0%	\$ 3,850	95.0%	\$ 10,450
3	Develop a security measure checklist	44.0%	\$ 70,106.00	25.0%	\$ 17,527	35.0%	\$ 24,537
4	Develop a PDA based program of the security measures	3.0%	\$ 5,000.00	1.0%	\$ 50	1.0%	\$ 50
5	Develop video companion to the checklist	1.0%	\$ 1,000.00	0.0%	\$ -	0.0%	\$ -
6		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
7		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
20	Final Report and Quarterly Reporting	40.0%	\$ 63,000	5.0%	\$ 3,150	10.0%	\$ 6,300
	TOTAL	100.0%	\$ 158,342		\$ 28,695		\$ 49,573

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Project Objectives:

The main objectives of this project are:

1. Establish security hazard levels and performance objectives for New Jersey bridges in coordination with NJDOT Bureau of Transportation Security and the Office of Homeland Security.



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2. Identify critical components in a typical bridge that are vulnerable to blast and impact loads and assess their capacities to resist these loads and evaluate the effectiveness of various security upgrade/retrofit schemes and countermeasures including cost and ease of installation.
3. Develop a bridge security checklist to perform on-site assessment of bridge components based on the results of Tasks 1, 2, and 3.
4. Develop a PDA-based program of the security measures checklist developed in Task 4 that can be downloaded into an NJDOT bridge security database.
5. Develop a video companion to the security measures checklist developed in Task 4 that can be incorporated into the database for each bridge.
6. Apply developed checklist, PDA, and video companion to bridge case studies.

Project Abstract:

Transportation infrastructure is one of most visible targets for terrorists since its destruction does not only cause an immediate impact on the nation, but also long-term economical impact. The terrorist attack on September 11th, 2001 crippled the PATH commuter rail that carried 67,000 passengers each weekday for two years resulting in relocation of office space and jobs to New Jersey. Since then funding for homeland security has increased by approximately 8.6 percent for the fiscal year 2006, in which 38.6 percent are allocated for Border and Transportation Security. However, spending alone is not the solution since both Federal and State agencies have modest expertise in implementing security for the nation's infrastructures.

To properly and effectively address bridge security, there is a need to establish security hazard levels and security performance criteria in coordination with NJDOT Bureau of Transportation Security. There is also a need to qualitatively and quantitatively assess critical bridge component that are vulnerable to terrorist threats and blast and impact loads. Then develop a bridge security assessment checklist that identifies vulnerable bridge components and security measures and establish a program to train NJDOT staff to perform bridge security check and assessment.

1. Progress this quarter by task:

- Finalized the checklist and updated comments from NJDOT Customer. Checklist is being distributed to Panel members and Subcontractor for further discussion
- Draft report is finalized and now includes the checklist.
- Subcontractor reviewed checklist and provided comments. Both Subcontractors are also assisting with the organization of the meeting with the panel of experts and the proposed workshop.

2. Proposed activities for next quarter by task:

- Continue to access NJDOT bridge management database.
- Produce video clips of various items related to bridge inspection and following the checklist provisions for bridges.
- Meet with the panel members to obtain feedback on the checklist and the draft report. This is planned for September in the form of a workshop.



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3. List of deliverables provided in this quarter by task (product date):

Draft Final report will be delivered to NJDOT prior or by Quarterly Report meeting in September.

4. Progress on Implementation and Training Activities:

insert text here

5. Problems/Proposed Solutions:

Total Project Budget	158,342
Modified Contract Amount:	
Total Project Expenditure to date	147,237
% of Total Project Budget Expended	93%

NJDOT Research Project Manager Concurrence: _____ Date: _____



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QUARTERLY PROGRESS REPORT

Project Title:	Bridge Deck Cracking and Composite Action Analysis		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: Anthony Chmiel	
TASK ORDER NUMBER: TO 190 / RU Acct 4-2xxxx		PRINCIPAL INVESTIGATOR: Dr. Hani Nassif	
Project Starting Date: 06/01/2006 Original Project Ending Date: 5/31/2008 Modified Completion Date:		Period Covered: 3 rd Quarter 2006	

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	4.82%	\$ 10,000	100.0%	\$ 10,000	100.0%	\$ 10,000
2	Literature Search	9.64%	\$ 20,000	50.0%	\$ 10,000	50.0%	\$ 10,000
3	Composite Action Analysis	19.27%	\$ 40,000	20.0%	\$ 8,000	20.0%	\$ 8,000
4	3D FEA - Composite Action	19.27%	\$ 40,000	5.0%	\$ 2,000	5.0%	\$ 2,000
5	3D FEA - NJDOT Deflection Requirements	12.04%	\$ 25,000	10.0%	\$ 2,500	10.0%	\$ 2,500
6	3D FEA - NJDOT Class A Concrete Requirements	12.04%	\$ 25,000	10.0%	\$ 2,500	10.0%	\$ 2,500
7		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
8		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
9		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
10		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
20	Final Report and Quarterly Reporting	22.92%	\$ 45,574	10.0%	\$ 4,557	10.0%	\$ 4,557
	TOTAL	100.0%	\$ 205,574		\$ 39,557		\$ 39,557

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Project Objectives:

The main objective of this study is to evaluate the cracking behavior of concrete bridge decks and explore the cause of the cracking problem related to design procedures. Using 3D Finite Element



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Method (FEM) as an analysis tool, the proposed project will identify the design procedures and parameters that most directly relate to the severity of cracking in bridge decks. Both AASHTO Standard Specification (LFD) and AASHTO LRFD Bridge Design Specification (LRFD) will be evaluated; especially regarding design provisions related to the shear studs and deflection limits. The identification process will be implemented in five tasks: (1) literature search; (2) evaluation of LFD and LRFD design procedures for composite action; (3) development of a detailed FE model that incorporates field measurements, environmental conditions (such as temperature and differential expansion between steel and concrete), and shrinkage behavior of concrete material based on actual data or laboratory testing; (4) deflection requirements; and (5) concrete compressive strength. The end result will be to provide a methodology that will enable New Jersey Department of Transportation (NJDOT) to successfully select the appropriate design modifications and construction guidelines that minimize the cracking potential of decks for girder bridges.

Project Abstract:

According to the American Society of Civil Engineers (ASCE) Report Card, the US infrastructure received a grade point average of “D” (i.e., poor rating) in 2005. Moreover, the National Bridge Inventory (NBI) (Federal Highway Administration, 2004) stated that of more than 594,470 bridges in the United States, about 150,981 (25.4%) are structurally deficient or obsolete. Major decisions must be made to allocate the limited funds available for repair, rehabilitation, and replacement. An investment of at least \$1.6 trillion is needed in the next five years to alleviate the problems. Accordingly, many State departments of transportation expend significant effort and resources on the construction of durable concrete bridge decks. Existing data and current research indicate that specific modifications to construction procedures, materials, and design details can significantly reduce the degree of cracking in bridge decks and thus reduce exposure of reinforcing steel to the corrosive effects of deicing chemicals as well as decrease freeze-thaw damage. A great deal is known about the factors that affect cracking in bridge decks, and what is needed is to implement this knowledge and monitor deck performance. However, there is need to fully understand the effect of various design parameters that are related to bridge cracking behavior.

To study the cracking behavior of bridge decks, a detailed 3D FE model will be developed. A general-purpose finite element program, ABAQUS, will be utilized to derive the model. ABAQUS includes a variety of routines that allow for defining specific material models and provisions, such as concrete cracking and tension stiffening models, reinforcing steel rebar, boundary conditions, bond behavior (e.g., shear studs) and interaction between the reinforcing steel bars and concrete, and its mechanical properties. In addition, early-age cracking is often associated with material properties of concrete, especially concrete mixes that have high early-age strength development or high shrinkage performance. Furthermore, the FEM results will be validated using field results from various sources including those developed at Rutgers University and relate the possible cause of cracking on the bridge decks (e.g., thermo-stresses, heat of hydration, shrinkage, and live load). Once the model is validated and calibrated using field and laboratory measurements, the parametric study on modifying the design procedure can be carried out. The results of this research will add to that knowledge and will lead to reduction in bridge deck cracking, an improvement in durability, and an increase in the useful life of bridges.



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1. Progress this quarter by task:

Task 1—Literature Search:

- Research team has collected various references including papers, reports, and case studies related to bridge deck cracking.

Task 2—Composite Action Analysis

- Design methods of shear studs in both LRFD and LFD AASHTO bridge design specifications are reviewed.
- Two examples were designed for simple spans with lengths of 100 ft and 160 ft. design outcomes are compared with regard to shear connector requirements based on the LRFD and the LFD codes

Task 3—Perform Analysis using a 3D FE Model Considering LRFD Composite Action Requirements

- A finite element model is developed for plate girder bridges as well as truss type bridges. ABAQUS software is used in developing the model that takes into account the concrete material properties, rebar mesh layers, bond, and cracking of concrete.
- The ABAQUS model includes special provisions that was used to model shear studs more accurately and to simulate their effect on the surrounding concrete at various ages.

Task 4—Perform 3D FEA for Typical Bridges with NJDOT Deflection Requirements

- The research has initiated the work on modeling different types of bridges and validating the results of the model using data from field tests performed using trucks of known axle weight and configuration. The field tests included strain and deflection measurements. One of the bridge sites used for this analysis is the Doremus Avenue bridge
- Reviewed deflection criteria from various sources and their effect on design outcomes.

Task 5—Perform 3D FEA for Typical Bridges with NJDOT Class A Concrete

- The research team has collected concrete samples at various ages including early age. The field tests included strain and deflection measurements. One of the bridge sites used for this analysis is the Doremus Avenue bridge

2. Proposed activities for next quarter by task:

Task 1—Literature Search:

- Research team will continue to collect references related to bridge deck cracking.

Task 2—Composite Action Analysis

- Design examples will be modeled using FE Analysis considering various shear studs provisions to evaluate their effect of restraint shrinkage cracking of concrete at early ages.
- Additional design examples will be produced and checked for future analysis of various restraint conditions produced by different types of studs.



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- Results from tests performed on composite beams with a reduced number of shear studs relative to code requirement will be used to compare restrained shrinkage behavior and their effect on cracking at early ages.

Task 3—Perform Analysis using a 3D FE Model Considering LRFD Composite Action Requirements

- Continue to improve on the FE model by including differ

Task 4—Perform 3D FEA for Typical Bridges with NJDOT Deflection Requirements

- Review deflection criteria from various sources such as States
- Work on comparison of deflection limits in various codes with the maximum observed deflection from various bridge projects.
- Check the effect of removing deflection limits on vibration behavior of certain type of bridges.

Task 5—Perform 3D FEA for Typical Bridges with NJDOT Class A Concrete

- Results from laboratory tests performed using the ring test will be compared to those observed in the field from measurement of shrinkage behavior at various locations in the bridge span. Locations to be considered are near end supports, mid and quarter span length.
- Mechanical properties of concrete mixes such as compressive strength, tensile, elastic modulus, will be studied.

3. List of deliverables provided in this quarter by task (product date):

- Literature review
- Finite element model for various types of bridges
- Results from laboratory tests on concrete mixes used by NJDOT on various projects throughout NJ. Results include restrained shrinkage strains recorded in the Modified AASHTO P 33 Ring Test.
- Field recorded early –age and long term strains

4. Progress on Implementation and Training Activities:

N/A

5. Problems/Proposed Solutions:

- Project funds as allocated by the research Bureau are limited to achieve all the tasks as was initially proposed. There is a need to plan pool fund for second year.

Total Project Budget	\$205,574
Modified Contract Amount:	
Total Project Expenditure to date	\$39,557
% of Total Project Budget Expended	19%



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NJDOT Research Project Manager Concurrence: _____ Date: _____



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Instrumentation and Monitoring of Bridge Approach Slabs – Phase II		
RFP NUMBER: N/A	NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj		
TASK ORDER NUMBER:	PRINCIPAL INVESTIGATOR: Hani Nassif		
Project Starting Date: 1/1/2001 Original Project Ending Date: 12/31/2004 Modified Completion Date: 12/31/2006	Period Covered: 3 rd Quarter 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search				
1. Instrumentation Plan and Field testing	30%	0%	100%	30%
2. Calibration of Sensors and DAS	20%	0%	100%	20%
3. Data collection and LTRM	20%	5%	100%	20%
4. FEM Verification	10%	0%	100%	10%
5. Progress Reports & Technical Memorandum	15%	5%	100%	15%
6. Monitoring of Victory Approach Slabs	20%	50%	85%	17%
Final Report	5%	60%	80%	4%
TOTAL	120%			116 (116/120 = 97 %)

*Added Task

Project Objectives:

To develop and specify new design method for bridge approach slab. The main objective of this study is to evaluate the cracking behavior of approach and transition slabs and the interaction between soil-slab-vehicle systems. The scope of the study is as follows:

1. Develop a detailed 3-D finite element model that would incorporate the nonlinear and cracking behavior of reinforced concrete as well as the inelastic soil properties.
2. Compare results from the 3-D model with distress observed on actual structures
3. Perform a comparative parametric study to optimize the slab design.
4. Instrument and monitor the long-term performance for the newly designed and constructed approach and transition slabs on Doremus Avenue bridge project.
5. Apply the newly designed slabs to new bridge projects and instrument them for more data collection and testing.

Project Abstract:

Bridge approach slabs provide a transitional roadway between pavement and the actual structure of the bridge. This transition is crucial in reducing the dynamic effects imposed on the bridge by traffic and truckloads. However, under the effect of heavy impact loads, coupled with unknown or inadequate soil conditions (e.g., settlement, embankment bulging, poor fill material, inadequate compaction, poor drainage, etc.), a number of approach slabs in the State of New Jersey have exhibited transverse structural cracking. This type of transverse cracking, as observed by site engineers of the New Jersey Department of Transportation (NJDOT) as well as the Rutgers Team, occurs even on relatively newly constructed slabs. Various design schemes of the approach and transition slabs (e.g. alteration of the thickness of the approach slab, adding number of rebars, increasing concrete strength, etc.) have been implemented, however, the structural cracking have persisted.

Despite the widespread occurrence of bridge approach problems, only a small number of research studies have been performed on the subject. Few studies have been developed for evaluating the cracking behavior of bridge approach slabs. However, this problem is becoming an increasingly important topic in the effort to deal with the



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deteriorating infrastructure and rehabilitation of roadways. Major decisions must be made to allocate the limited funds available for repair, rehabilitation and/or replacement on the basis of a detailed evaluation of the structural integrity of bridge approach slabs. Therefore, there is a need for new design schemes that can ensure crack-free slabs and for the field monitoring their behavior under actual truck traffic.

1. Progress this quarter by task:

- Visited the Doremus Avenue Bridge to check the performance of the Approach Slab in each lane. No cracking is observed in the right lane northbound which has the new design alternative. It was observed that settlement of South abutment is still underway due to movement of soil foundation and embankment.
- Continue to collect and monitor the approach slab on Doremus Avenue and Victory Bridge.
- A final approach slab detail is approved as the standard detail for future use in NJDOT projects.
- Submit a draft final report that will cover the field installation, monitoring, and performance of the new bridge approach details.

2. Proposed activities for next quarter by task:

- Continue monitoring and data collection of the approach slabs at Victory Bridge and Doremus Avenue Bridge.
- Update the final report by including the comment and suggestion of NJDOT.

3. List of deliverables provided in this quarter by task (product date):

N/A

4. Progress on Implementation and Training Activities:

N/A

5. Problems/Proposed Solutions:

- Access to the Victory Bridge data logger location is still limited. The only access to the data logger right now is during regular inspection. Data has not been download since the end of construction. It is expected that a few month of data will be lost.

Total Project Budget	NA add-on
Modified Contract Amount:	
Total Project Expenditure to date	NA add-on
% of Total Project Budget Expended	NA add-on

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.



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NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Implementation of Weigh-In-Motion (WIM) Systems		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj		
TASK ORDER NUMBER: 92 / 4-23941	PRINCIPAL INVESTIGATOR: Dr. Ali Maher		
Study Start Date: 06/14/2000 Original Study End Date: 12/31/2003 Modified Completion Date: 6/30/2005	Period Covered: 3 rd Quarter 2006		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	10%	0%	100%	10%
1. Packaging	17%	0%	100%	17%
2. Testing	14%	0%	100%	14%
3. Site Determination	11%	0%	100%	11%
4. Field Implementation & Calibration	16%	7%	100%	16%
5. Monitoring and Analysis	22%	15%	75%	16.5%
Final Report	10%	10%	30%	3%
				87.5%

1. Progress this quarter by task:

- A. Work was continued on the Technical Report.
- B. Previous data collected is still being analyzed.
- C. We are still trying to schedule time on the Ceramics Dept equipment to do a piezo degradation analysis. This will show if the actual sensor survived the field trials. If the sensor did not significantly degrade then it was merely a packaging failure; however, if the sensor did degrade then the material may not be suitable for this application. This is the **ultimate question** of the study.
- D. Preliminary tests were conducted, the resonance-antiresonance peak is proportional to the piezoelectric coupling coefficient, which in turn determined the d-coefficients. The pristine samples (2 bars) have a thickness mode resonance width of ~38 KHz, while the field-tested samples have ~30 KHz. That means there has probably been some aging under cycling loading. But those sensors would still produce a signal of sufficient strength to detect whatever needs to be detected. Hence, at this point in time, it appears the sensors' failure is due to delamination of the metallization, thereby causing the ohmic contacts to disappear. As such, no signal can be generated for sensing. In other words, the problem is a "packing problem".

2. Proposed activities for next quarter by task:

- A. Conduct a laboratory tensile experiment to determine the effects of top-down cracking. We are still waiting to schedule time on the tensile tester....there was a series of samples scheduled prior to the piezo and the testing took longer than expected. The piezo is the next in line and we expect to conduct this testing in December. Once, this test is complete in conjunction with the APA calibration testing the study should be complete.
- B. The only other work that may be conducted would be a final field installation with the repackaged sensor (depending on the above testing results). The decision to conduct this test will be up to NJDOT as this would require some expenditure of funds for more material and installation.

3. List of deliverables provided in this quarter by task (product date):

N/A



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4. Progress on Implementation and Training Activities:

N/A

5. Problems/Proposed Solutions:

- The equipment that is needed for the final step of the evaluation is still out for repair. We are in constant communication with the Ceramic Dept to find out when this equipment will be back and available to wrap up the final test.

Total Project Budget	\$194,500.00
Modified Contract Amount:	
Total Project Expenditure to date	\$104,251
% of Total Project Budget Expended	54%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.